

The United States MILLER

Volume 11.—No. 4.

MILWAUKEE, AUGUST, 1881.

Terms: \$1.00 a Year in Advance. Single Copies, 10 Cents.

The Improved Condition of Wage-Earners.

Neither the census enumerations nor the wages statistics of different countries sustain the assumption of the socialists that the rich are growing richer and the poor poorer. There is evidence enough that the rich are growing richer, but there is equally conclusive evidence that the poor are not growing poorer. That is to say, there is conclusive evidence that those who work for wages are better paid not only in money, but in money's worth, than they were thirty years ago or more; and this is precisely what the socialists deny when they assume that the poor are growing poorer, for when they speak of the poor they mean those who work for wages, and not those who are dependent upon public or private charity for support, and who are neither poorer nor richer than they always have been, though they probably receive more than ever before without rendering an equivalent.

Statistics recently compiled show that the improvement in the condition of the wage-workers has been even greater than has been generally supposed. Much has been said about the depressed condition of industry in Germany, and the unsatisfactory wages received by workmen in that country. But the late enumeration shows that the increase in the population of the German Empire since 1875 has exceeded 2,500,000, notwithstanding the great emigration from Germany to the United States, and other countries. This increase would hardly have taken place had the state of the workmen been so desperate as has been supposed.

This fact respecting population, it must be confessed, is not of itself conclusive. But we have some facts of another kind which place the matter beyond dispute. *La Statistique de France* contains a table showing the advance of wages in different trades from 1853 to 1877. This table shows the advance of wages in thirty-five different trades, as well as in the case of common workmen. The average advance was 52 per cent. In the case of common workmen it was 70 per cent; jewelers, 47 per cent; butchers, 64 per cent; bakers, 74; brick-makers, 49; coachmakers, 57; carpenters, 70; and so on. These figures alone would not prove that condition of French workmen was better in 1877 than in 1853, for they do not show whether or not there was a corresponding advance in the prices of articles consumed by workmen. But the compiler of the statistics notes the fact that the price of bread has remained stationary. It is to be regretted that he did not push his inquiries further in the same direction, but this one fact goes a long way toward showing the relative condition at the two points of time of a class of men subsisting so largely as French workmen do upon bread. Possibly there has been some small advance in the prices of articles of clothing, but in view of the great improvements that have been made in the machinery and processes of textile manufacturing since 1853, this is in the highest degree improbable. It is possible, too, that there has been some advance in the prices of animal foodstuffs; but this also is highly improbable, in view of the recent action of the French agricultural interests against American competition. There is much reason to believe that French workmen have to pay no more now than they did in 1853 for such articles of food and clothing as they consumed at that time, while they have on the average 52 per cent more wages with which to enlarge their consumption. Probably the only item in the cost of living which has perceptibly advanced in price since 1853 is shelter, and there is no evidence at hand that even this item costs any more now than it did a quarter of a century ago. This is the more remarkable in view of the enormous tax burdens to which the French people are subjected.

It is the expressed belief of the socialistic agitators that the great mechanical inventions of recent times have been made instruments in the hands of the rich for the robbery and degradation of the "horny-handed sons of toil." But the compiler of the French statistics points out that the remarkable advance in wages in France took place during the very period when the richest results of modern invention were being realized. He also points out that the rise in wages was greatest in those trades in which machinery came largely into use. It is not to be denied that capitalists have accumulated vast sums by the employment of modern machinery; but neither can it be successfully denied that the condition of workmen has been greatly improved by the introduction of this same machinery. "Machinery," says a contempor-

rary, "has not been in the hands of the capitalist the means of superseding the workman and making him more dependent upon the employing class; it has, on the contrary, made the employer more dependent upon the workman; who, consequently, has been able to increase by one-half his former allowance of the joint rewards of capital and labor." This is unquestionably true. And the end is not yet. Machinery will lift the workman still higher. It will enable him to obtain more and better subsistence, and more education, and it will thus most likely make him a better citizen, and a stronger bulwark of political and social institutions. It will tend to make him less a socialist and destroyer, and more an individualist and reformer.—*Chicago Times*.

ARTIFICIAL SEASONING OF TIMBER.—Mr. C. Rene, pianoforte manufacturer, of Stettin, Germany, has devised a plan by which he utilizes the property of oxygen, particularly of that ozonized by the electric current, to artificially season the timber used for the sounding boards of musical instruments. The first impulse to experiments being carried out in this direction was given by the well-known fact that wood, which has been seasoned for years, is much more suitable for the manufacture of musical instruments than if used soon after it is thoroughly dried only. Mr. Rene claims that instruments made of wood which has been treated by his oxygen process possess a remarkably fine tone, which not only does not decrease with age, but as far as experience teaches, improves with age, as does the tone as some famous old violins by Italian masters. The sounding-boards made of wood prepared in this manner have the quality of retaining the sound longer and more powerfully. A number of pianos manufactured at Mr. Rene's works, and exported to the tropics several years ago, have stood exceedingly well, and seem in no way affected by the climatic dangers they are exposed to. While other methods of impregnating woods with chemicals generally have a deteriorating influence on the wood fibres, timber prepared by this method, which is really an artificial ageing, becomes harder and stronger. The process is said to be regularly carried on at Mr. Rene's works, and the apparatus consists of a hermetically closed boiler or tank, in which the wood to be treated by the process is placed on iron gratings; in a retort, placed by the side of the boiler and connected to it by a pipe with stop-valve, oxygen is developed and admitted into the boiler through the valve. Provision is made in the boiler to ozonize the oxygen by means of an electric current, and the boiler is then gently fired and kept hot for forty-eight or fifty hours, after which time the process of preservation of wood is complete.

Items of Interest.

CORRODED JOINTS.—Any diffusive or volatile liquid, such as kerosene oil or naphtha or even turpentine will in a short time penetrate between some minute crevice in joints that have been long in contact, whether bolts or nuts or steam joints. In addition to this use they should be ignited when possible, when the effects of heat and diffusion will soon loosen the metals. Nuts rust so tight sometimes that no wrench, however strong, will remove them without breaking off the bolts belonging to them. A gentle hammering on the sides and top will sometimes start them a little. A driven joint, or rust joint, between flanges, formed by cast iron borings and sal ammoniac in solution in them, cannot be parted by any means short of destroying the castings. The scrap heap is the only remedy.

LAST year the total product of gold in the whole world was \$118,000,000, nearly half of which was mined on the continent of America. The product of silver was \$94,000,000, of which \$76,000,000 was produced in this country. The grand total of precious metals was \$212,000,000, an increase, as compared with the three preceding years, owing mainly to the increase in silver mining here.

A Southern Enterprise.

THE PACKAGE ELEVATOR AT MEMPHIS, TENN.—THE RESULT OF THE LABORS OF WILLIAM WATSON, C. E.

We take the following from the issue of the *Memphis Daily Appeal* of July 17th, and believe that many of our readers will note with pleasure the completion of this substantial improvement:

The work now going on at Center Landing is, perhaps, the most important and largest enterprise in the South, and shows that our business men have faith in Memphis. About three months ago a stock company was formed, composed of some of our most wealthy and enterprising citizens, for the purpose of building a large package and grain elevator. Mr. J. C. Neely was chosen President, and Mr. Louis Hannauer Secretary and Treasurer. Center Landing was leased from the city for a term of years, and work commenced some six weeks ago. A reporter of the *Appeal* called on Mr. William Watson, the architect and superintendent, at his office, foot of Washington street, yesterday, and obtained the following description of the building:

The space to be occupied extends from the south side of Poplar street to the north side of Locust street, a distance of 525 feet. Then from the west side of Promenade street to the water's edge. All this will be covered with a two-story warehouse, except where the grain elevator stands at the northwest corner. From the water's edge it will extend out 80 feet, making the building 360 feet wide. That part extending over the water will be on piles. Due precaution will be taken to prevent any washing or cutting into the bank by the action of the current. The main part of the buildings will rest on stone piers. All floors will rest on heavy yellow pine joist, and be best white oak, two inches thick. The outside will be covered with corrugated iron and a gravel roof. A double row of windows will run full length of roof, affording ample light and ventilation. It is so planned that teams can drive in or out on either floor from Poplar, Washington or Locust streets.

There will be four elevator legs to receive freight from boats. These will be of the latest and most approved design, and it will be so arranged that freight can be landed on either floor, or taken from upper floor to the lower one, or to the boats. There will be two tracks on the upper side of the building for the exclusive use of the elevators. The floor of the cars will be on the same level of the warehouse floors.

The excavation for the package elevator is about completed, and the work of putting in the piers will commence Monday. The foundation walls of the grain elevator were completed Friday, and the carpenters are now at work on the crib-work or bins. The capacity of the elevator will ultimately be 400,000 bushels, but to hurry the work forward the foundations have only been completed for 200,000 bushels storage. The walls are massive and calculated to stand any strain that can ever be put on them. The length of elevator and engine-house is 145x60 feet wide. The bins will be 55 feet high, and extreme height of building will be 115 feet. There will be 66 bins in the house with capacities from 1,000 to 6,000 bushels each. The engine and boiler-rooms will be placed at south end of the elevator. There will be two engines of 100-horse power each. One of them will be used to run the package and the other the grain elevator. There will be two boilers 60 inches in diameter, 18 feet long and forty-five 4-inch flues. Located in the engine-room will be a large pump for fire purposes, with pipes running all through both buildings. A 80-inch, 5-ply rubber belt will run from one of the engines to a line shaft in the top of the grain elevator to drive the elevator legs. These legs will have an elevating capacity of 10,000 bushels an hour. There will be six Fairbanks Hopper Scales with all the latest improvements in the top of the building with a capacity of 42,000 pounds each. From these scales a revolving spout enables them to distribute the grain into any of the bins or into the shipping bins, and from there to the cars or draw down on the first floor for sacking. Three cars can be loaded at the same time and in three or four minutes. The spouts are so arranged that there will be no shoveling. There will be three dock legs on the river front, to take grain from barges, and three drag-belts to carry into the elevator, a distance of 255 feet. There will be three shovels run by steam, enabling them to unload a barge at the rate of 10,000 bushels per hour. Latest improved cleaning machines will be placed in the elevator to clean all kinds of grain.

American Flour in China.

A few evenings since the *San Francisco Bulletin* had a commercial article respecting flour shipments, in which appeared the remark that "we cannot expect to make too much headway in extending our trade with Hong-kong. It is not the Chinese who are taking our flour at that point. Were that the case the demand might be developed to an indefinite degree, provided we could sell wheat cheaper than it could be raised in China. It is European population at Hong-kong and in China (says the *Bulletin* man) that takes the bulk of the flour sent there, and the number is limited." This is absurd upon its face. What is the white or European population at Hong-kong or China that would consume even a single cargo of flour that we ship to that country every year? According to the *Bulletin*, we shipped to Hong-kong, in 1880, 234,332 barrels of flour. For several years past the French Government ordered from Saigon three times a year 666 barrels extra strong bakers' flour. Formerly this was sent in barrels lined with paper, French style, but of late years quarter sacks have been substituted. With this exception, the bulk of flour sent to Hong-kong (China) is shipped by the Chinese merchants resident here, and is by their own countrymen consumed in the Chinese Empire. Only a small percentage of the flour exported to China consists of extra. The very fact that a large portion of the flour shipped to China consists of superfine, and that too of the very lowest grades, is conclusive evidence that the Chinese themselves are largely substituting it for rice, and this is also the case in this country, the resident Chinese here consuming considerable flour. This flour trade with China is steadily increasing—not a steamer leaving this city for Hong-kong that does not carry thousands of barrels. The British steamship *Naples* is now loading considerable flour for that port, the freight of which is \$8 per ton. We do not see the policy of underrating our export trade with China, as is exhibited of late years by a portion of the press of California as well as by Government officials at Washington. For more than a century all exports and imports to and from Hong-kong were credited to China, but within the past few years a change in this regard has been made, seemingly with a view to belittle the China trade with this country and make it appear of less value than it really is.—*San Francisco Commercial Herald*.

A NEW METHOD OF PREPARING PAPER TISSUES, WOODEN TABLETS, &c., for the purposes of painting, has been patented in Germany by M. Dupays, of Nancy, the advantages being, that in use of crayon or chalk, the colors adhere better to the surface; in water-color work the moisture is long retained, so that the color-tones remain unchanged during work, and in oil painting the colors easily mix, greatly facilitating the work of beginners. The process is essentially as follows: One or two coats of size are first applied to remove porosity, then a thin layer of a paste of white-lead (300gr.) and boiled oil (50gr.) is put on. After drying for half an hour, fine cotton dust is sprinkled on the surface from a sieve and by striking the piece on the back, the fine cotton fibres are caused to raise, forming a velvet-like surface. The material is let dry two or three days, and brushed with a woolen brush so as to depress the cotton somewhat; then a mixture of white-lead (8pts.), gold lac (1pt.), spirit of turpentine (1pt.), and starch (1pt.) is applied. This is equally distributed by passage between rollers, with caoutchouc surface. The cotton particles are raised again with a fine brush of couch-grass, and after two or three days' drying the material is put in a bath of alcohol and water (half of either).

SUBSCRIBE for the U. S. MILLER.

UNITED STATES MILLER.

PUBLISHED MONTHLY.
OFFICE, 62 GRAND OPERA HOUSE, MILWAUKEE, WIS.
Subscription Price.....\$1 per year in advance
Foreign Subscription.....\$1.50 per year in advance

ANNOUNCEMENT:

Wm. DUNHAM, Editor of "The Miller," 69 Mark Lane, and HENRY F. GILLIG & Co., 449 Strand, London, England, are authorized to receive subscriptions for the UNITED STATES MILLER.

MILWAUKEE, AUGUST, 1881.

We send out monthly a large number of sample copies of THE UNITED STATES MILLER to millers who are not subscribers. We wish them to consider the receipt of a sample copy as a cordial invitation to them to become regular subscribers. Send us One Dollar in money or stamps, and we will send THE MILLER to you for one year.

MILLERS' DIRECTORY.

All mill-furnishers, flour brokers or other parties desiring to reach the flour mill owners and millwrights of the United States and Canada, should have a copy of the above named work. It contains about 15,600 names with Post-office addresses, and in many cases (notably in Wisconsin and Minnesota) gives the number of runs of stone, sets of rollers, and kind of power used, or the capacity in barrels. A limited number of copies only have been printed. Upwards of 200 of the leading mill-furnishing houses and flour brokers in this country and several in Europe have already secured copies. Send in your orders at once. Price Five Dollars, on receipt of which Directory will be forwarded post-paid by mail. Address,

UNITED STATES MILLER,
MILWAUKEE, WIS.

The United States Consuls in various parts of the world who receive this paper, will please oblige the publishers and manufacturers advertising therein, by placing it in their offices where it can be seen by those parties seeking such information as it may contain. We shall be highly gratified to receive communications for publication from Consuls or Consular Agents everywhere, and we believe that such letters will be read with interest, and will be highly appreciated.

We acknowledge with pleasure the receipt regularly of the "Weekly Grain and Flour Trade Circular," published by Messrs. Gibson & Clark, flour merchants at 32 Waterloo St., Glasgow, Scotland.

PENNSYLVANIA yields one-fifth of the rye produced in this country. The annual produce in that State ranges between three and four million bushels. It is a rare thing to see a poor field of rye, when carefully cultivated.

A GERMAN authority reckons the amount of capital lost to his country by emigrants to America at \$2,460,000,000. Some German economists maintain that emigration is advantageous to the fatherland, which, in their opinion, suffers from over-population.

THE lowest rates on grain ever known are now charged from Chicago to Liverpool; the rate via Montreal being 15 cents per bushel, and via New York 18 cents. This looks well for the railroads, which were enabled to pay dividends last year solely on account of the very high freight rates which then ruled.

We are informed by Hon. Alfred E. Lee, United States Consul-General at Frankfort-on-the-Main, that copies of the UNITED STATES MILLER are on file in the reading-rooms of the Universal Patent Exhibition, now in progress in that city, which is being largely attended.

WE would call the attention of any of our readers who may desire to own a mill in one of the most beautiful sections of country in the United States, to the advertisement in another column of the mill at Stone Bank, Wis. This is near Waukesha, Oconomowoc and other noted watering-places, and in the midst of a handsome group of lakes.

EVERY operative miller should be a regular subscriber to the UNITED STATES MILLER. You will find it will pay you to take it regularly and carefully read its contents. These are days of rapid changes in the methods of milling, and no one needs to be better posted

than the operative. The one dollar it will cost you to become a subscriber you will find most profitably invested.

NEW ZEALAND, in 1876, produced 1,770,863 bushels of wheat, 2,888,688 bushels of oats, 620,699 bushels of barley, and 17,895 tons of potatoes, the total acreage under cultivation being 152,982. Last year the acreage had increased to 389,729, the product being 5,461,000 bushels of wheat, 7,776,275 of oats, 1,124,281 of barley, and 37,466 tons of potatoes. Sheep raising has similarly advanced. A hundred years ago there were 29 head, and now, it is stated, there are 12,000,000.

It appears that the English no longer advocate the Swiss system of appropriating the creation of another's mechanical genius. Those who once would have repealed the existing patent laws now confine themselves to an endeavor to prevent the rights of the inventor encroaching on the interests of the public. The bill, by a Mr. Anderson, now before the British parliament, proposes to encourage inventors by lowering the fees for taking out a patent, by enlarging the period allowed for payment, and by extending the duration of patent right. The bill was favorably received, and there is reason to believe that the unsatisfactory state of the English patent laws will thus be largely remedied.

CONSUL Eckstein makes the following interesting statement regarding the grain trade of Amsterdam: "The only especially noteworthy and somewhat striking feature in the past year's grain trade has been in this, that in the course of it large quantities of Indian corn, or maize, have been imported from the United States and found a ready market here. I speak of what is known in the trade here as 'mixed maize.' It is said to be advantageously substituted for rye, or mixed therewith, and when ground into flour is used for making bread, and for other purposes serving as human food. To a certain extent it is also used in distilleries. Present appearances indicate that the demand for the article will largely increase in the near future, as arrangements are now under way in some of the largest distilleries for the purpose of adapting them so as to use 'corn' hereafter in the manufacture of spirits, in the place of other materials formerly used."

A Word to Advertisers.

The advertising columns of the UNITED STATES MILLER are of great value to all desiring to reach the milling and grain trade. It is sent to all millers in the United States and Canada at intervals (whether subscribers or not), whose names and addresses we have been able to obtain. It is on file in the offices of U. S. Consuls in all parts of the world, and also in the principal Chambers of Commerce in America and Europe. Our foreign subscription list is constantly increasing, as also we are glad to note our foreign advertising patronage. We have received many letters of high approval of the UNITED STATES MILLER from subscribers and advertisers. Parties desiring further particulars in regard to amount of circulation, rates, etc., will be promptly supplied with information by addressing us.

AN invention has just been made by a firm of German gun-manufacturers which promises to add greatly to the power of artillery. Hitherto the fear of premature explosions during the transport or filling of shells has prevented any large employment of nitro-glycerine, and certain other extremely violent but easily inflammable explosives, for the purpose of charging them. It is claimed for the new invention that it will enable such substances to be used without danger. The interior of the shell is divided into a number of cells, which are to contain substances to be used without danger. The interior of the shell is divided into a number of cells, which are to contain substances non-explosive in themselves, but which, when combined, form a powerful explosive. The walls of the cells must therefore be broken up before an explosive charge is formed within the shells; and the inventor proposes to make these partitions of such strength that, while they will withstand ordinary jolting, they will be shattered by the shock to which a projectile is subjected when fired from a gun.

THE GERMAN CENTRIFUGAL FLOUR DRESSING MACHINE.—All German milling papers of late bring to hand an article from the pen of Mr. Richard C. Webb, a critic of centrifugal flour dressing machines. In this essay the author describes the advantages of the machines as well as the disadvantages. The

former are but few. The latter are so plenty that he comes to the conclusion that the centrifugal reels are not fit to use at all. As the article is too long for literal translation, I will give your readers the essence of the essay in brief. The advantages of the machines are their great capacity compared with common reels, occupying but little room. The disadvantages are: great tendency to produce specky flour; necessity of very fine silk in order to prohibit that, which silk has to be made extra strong in order to last long; delay in replacing the cloth in case of a break down; great amount of wear and tear, as it is a complicated fast-speed machine, and thus a bother to the miller; it is apt to shake the mill floor, if beaters are not well balanced; it must be built strong, and will, therefore, be quite heavy; and last but not least, it is a great power consumer. Then he reflects on the merits and demerits, and comes to the conclusion already stated above.—*Holmophilos.*

Review of the Market.

(Written for the United States Miller.)

MILWAUKEE, August 1, 1881.

The wheat market here is in an anomalous condition, the general feeling being in favor of lower prices, but operators are deterred from selling for future delivery by the fear of a manipulated market, it being apparently under the control of a powerful "clique," who are understood to hold a large line for August and September delivery, and have succeeded in working August deliveries 5 to 6 cents above September at Chicago, which, it is apprehended, may be repeated on September.

Harvesting in the winter wheat States has developed a large deficiency in the crop as compared with the previous one, which is variously estimated at from eighty to one hundred and twenty million bushels; and in consequence farmers are inclined to hold back their surplus, and deliveries have thus far been small. Receipts at the three principal winter wheat markets, Toledo, Detroit, and St. Louis, for the month of July have been three million bushels against six and a half millions during the corresponding time last year. Receipts are, however, beginning to be more liberal at Toledo and St. Louis, as is also the case at seaboard markets.

Crop reports from the Northwest for the past week have shown a marked improvement, and with favorable weather for harvesting, which is now in general progress, we look for a better crop of spring wheat, both in quantity and quality, than we have had since 1877.

We quote the market closing dull to-day at \$1.15 for No. 2 cash or seller August, \$1.18½ September, and \$1.19½ October.

E. P. BACON & Co.,
Commission Merchants.

Personal.

C. R. Fieser, Esq., representing the firm of Geo. W. White & Co., bucket manufacturers, called on us while on his way to Northern Wisconsin to spend the Fourth.

It is with pleasure that we acknowledge calls during the past month from Mr. H. T. Van der Cook, agent for the Northwest of the Electric Middlings Purifier Co. Mr. Van der Cook is accompanied on his Western trip by his wife, and they express themselves highly pleased with our fair city of Milwaukee.

THE head miller of the New York City Mills, Mr. J. C. Heuler, has been in Milwaukee for the last three weeks. His employers, Messrs. Jones & Co., are rebuilding and enlarging their old mills. They will soon be prepared to produce 1,200 barrels of flour per 24 hours. The plans of the new mills are made by W. D. Gray, of Edw. P. Allis & Co. The mill will be of the all-roller system, and no stones will be used. Mr. Heuler is here to help matters along as fast as possible, and arrange his milling diagram. He was head miller of C. Manegold & Sons, in their Reliance Mills, a mill of first-class reputation. On account of the excellent flours produced during his stay at that mill, Mr. Heuler received a call from Jonas & Co., with flattering offers, and he accepted it. He is bound to be successful wherever he heads a mill.

The Winona Mill Co. have received several car loads of machinery for the enlargement of their mill at Winona, Minn. When completed this mill will have 150 of the Gray patent noiseless roller machines, all working on one floor. They are porcelain rolls entirely for middlings, and have no stone in the mill. Their motive power is a large compound condensing Reynolds' Corliss engine. Edw. P. Allis & Co., of Milwaukee, furnished all the machinery, rolls and engine.

"BEST in the WORLD."

GARDEN CITY
WHEAT BRUSH

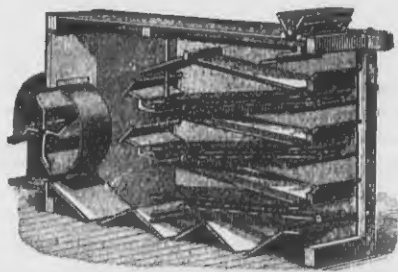
Gathmann's patent "inclined bristles" prevents all clogging when the brushes are run close together. This is the

ONLY DOUBLE BRUSH

Which can be set up close so that it will

Thoroughly Brush Wheat.

It don't break or scratch the grain. Removes all the dust. Very light running. Send for a circular and prices.

GARDEN CITY
MIDDINGS
PURIFIER!

Travelling Cloth Cleaners.

Our improved Purifier has every device requisite to make it perfect, and every one in use is giving the greatest satisfaction to the users. The Cloth Cleaners are guaranteed to clean the cloth better than is done on any other purifier. Send for our new circular.

We are agents for the

BODMER

Bolting Cloth

Which has long been acknowledged as the best made, and which has lately been further improved, making it now beyond competition. We make it up in the best style at short notice. Send for prices and samples.

Garden City Mill Furnishing Co.,
CHICAGO, ILL.

(Mention this paper when you write us.)

The Daisy Roller Mills.

BY HOLMOPHILOS.

[Written expressly for the United States Miller.]

The last mill on the south end of the canal of Milwaukee, one of the smallest in the phalanx of world-famed sisters, is just completed. The mill, which is intended to be a model mill, provided with all modern improvements, named by the proprietors by the emblem of modest beauty amongst the flowers, is running, bringing upon the market the beauty of the flours. The second mill built in Milwaukee, a mill named after one of the pioneers of this city, the Kilbourn mill, has furnished the ground and some of the walls of the building. It was the property of Mr. Mr. Edw. Sanderson, who, combined with Edw. P. Allis, the founder of the world-famed mill furnishing house of Edw. P. Allis & Co., concluded to rebuild the mill and make out of it a mill of the most advanced standing. The gentlemen rebuilt the inside of the old mill house, put on two more fourteen-foot stories, built an addition on the river side, 24 feet deep and of the same width as main building, reaching to and being covered by main roof, which is a flat gravel roof, and thus the best adapted for a flour mill. Also a boiler-house was erected, adjoining the addition on river side. The mill-house thus formed is 40 feet by 72 feet; it has a basement of 13 feet height, a grinding floor 12 feet, a bin floor 12 feet, one bolting floor 14 feet, one bolting floor and attic, each 14 feet high. The 24 feet addition contains in its basement the engine room, and above this the wheat cleaning machinery, which is divided from mill proper by a brick wall extending up to the attic. The whole building is heated during cold season by H. Mooers & Co.'s steam radiators. After thorough deliberation the mill owners took out the water wheel, abandoned the use of the water power on account of the unsteadiness of supply and put in a Reynolds-Corliss compound condensing engine, high and low pressure cylinders, measuring respectively 14 and 26 inches in diameter, the piston-stroke being 42 inches. The cylinders are located one back of the other, the same piston-rod carrying both pistons, the high pressure cylinder being nearest to the crank. The air pumps and condenser combined is driven by belt of main shaft of engine. In order to save consumption of fuel to the highest degree, a Reynolds patent feed-water heater is put in, in which the temperature of the overflow water of the condenser is raised to about 30 degrees by the exhaust steam on its way to the condenser.

The speed of the engine is 75 revolutions per minute. The power of the engine is transferred to the main shaft by a 24-inch leather belt over a 14-foot fly wheel. The main shaft drives two lines of Gray's patent four-roll 9x18 mills; a third line of these machines is driven by a parallel shaft, whose motion is effected by a 14-inch belt from main line. Along one side of the basement hangs another shaft in 24-inch adjustable hangers, which sets the flour packers in motion. In the basement also is found a suction fan, drawing air through all roller mills in order to keep grinding floor as near free of dust as possible. This fan discharges into a Kirk's dust collector, which retains even the finest dust very readily and keeps its cloth clean automatically. The main shaft drives directly up on to the purifier line shaft in fourth story by a 24-inch leather belt kept in necessary tension by an all-iron tightener of elegant design. This shaft drives all purifiers and a fan for Gray's suction purifiers. In the wheat cleaning part of the mill it drives by internal and external V friction wheels the horizontal shaft for cleaning machines whose driving shafts are located horizontally, and this one drives an upright shaft, giving motion to the cleaning machines of upright character.

By a few turns of a hand wheel, pulling the friction wheels together, the cleaning machinery will gradually be set in motion; by turning hand wheel in opposite direction all cleaning machinery will gradually stop. This is a very desirable arrangement for those mills not wanting to clean during night. They may clean enough wheat in day time to hold out for the night, and lay idle for that time the whole cleaning machinery, a group of fast speed machines, all inclining to have hot bearings if not cared for very closely.

The purifier shaft drives a slow upright-shaft by a pair of bevil cores, which again drives a cross-line underneath the roof, of which, at right angles the elevator line shaft and reel line shaft are driven by bevil wheels.

The mill contains as few shafts and gears as are necessary to run it; the millwright work is done elegantly; all shafts are laid in babbitt boxes and the mill started off light and with-

out the least trouble. It contains 8 corrugated 9x18 four-roll machines, 10 9x18 four-roll porcelain and 5 9x18 four-roll smooth iron mills.

All of these are the celebrated Gray's patent belt-driven noiseless machines, highly finished, all bright work being nickel-plated. It contains also 3 Eureka flour packers, 1 Eureka bran packer, 12 Smith No. 6 purifiers, 2 Gray's shaker-suction purifiers for coarse middlings, 4 Gray's suction purifiers to repurify coarse middlings, 4 of Gray's aspirators for the breaks, 1 bran and 1 shorts duster, 4 long shaking-graders, 2 eight reel chests (cloth 12 feet long) and 2 eight reel chests (cloth 13 feet 6 inches long), 1 zig-zag dust-room, stationary, and one of Kirk's dust-collectors, 1 wheat grading reel, 1 No. 2 Richmond receiving separator, 1 No. 3 Richmond wheat separator, 1 double cylinder Kurth cockle machine No. 00, 1 No. 4 Barnard & Lea's victor amutator with lengthened scourer, 1 No. 5 Richmond brush, 1 Fairbank's 60 bushel hopper scale, 3 Fairbank's flour packer scales.

The wheat is entered on west-end of mill, weighed and then conveyed by a 10 inch Caldwell iron conveyor to the receiving elevator, discharging into the receiving separator, whence it passes into two large bins built in lamina fashion, each capable of holding 3,500 bushels. These bins are a part of the cleaning machinery addition of mill house; they discharge into the dirty wheat elevator, bringing the wheat to the bin in the attic, being placed right over the separator.

From this machine it is elevated to a wheat-grading reel in the attic. The large wheat passes into the smutter; the smaller wheat, containing the cockle, drops on to the cockle machine. By this way of keeping the large wheat out of the cockle machine, the capacity of picking out the cockle is greatly enlarged. It seems our wheat becomes to be so full of cockle that we can hardly buy machines enough to pick it out. From the cockle machine the wheat drops into the smutter; thence it is elevated to the brush machine; from which it passes over a magnetic separator into the first break rolls.

The handling of the middlings in reels and purifiers is hard to describe without a diagram. I can only tell this in a condensed way. All middlings except the dust middlings, finer than No. 8 silk, are graded on four shaking graders in the attic, making 300 strokes per minute. These graders are 20 inches wide and 20 feet long, and clothed with grits gauze. They stand on ash springs, and are located directly over the purifiers. They separate coarsest, coarse, first-class fine, and second-class fine middlings, which are dropping into separate purifiers. The coarse middlings are cleaned on Gray's shaker suction purifiers, the fine middlings on Smith's machines. The system of purification is a very unique one. The machines stand on two floors; the lower machine always re-purifies the cleaned middlings of its upper mate; and the tailings of the finer clothed machines are elevated by small elevators into the next machines, clothed coarser. The purifier-blowings are received by the stationary zig-zag dust-room in the attic. The purified middlings are then ground separately on rolls, whereby I have to state that the coarse middlings are crushed on smooth iron rolls. The fine middlings and the dust-middlings are floured on porcelain rolls.

Coarse tailings are also crushed on smooth iron rolls, and fine tailings and first and second and low grade stuff are ground on porcelain rolls.

The flours made are two qualities of Patent, Nos. 0 and 00; two qualities of Bakers', Nos. 1 and 2, and Low-grade flour No. 3.

The mill is capable of producing 300 barrels of flour per 24 hours. It was designed and built by Edw. P. Allis & Co.'s famous mill engineer, Mr. W. D. Gray, who illustrated once more by this mill that perfect milling can be done on the all-roller system. He deserves the credit of having originated this system, being persuaded that the "finishing up" can be accomplished with rolls; that thus a kind of low grade flour is made which easily may be sold in this country on account of its color and strength.

Mr. Gray made the diagram, showing the numbers of silk required, the spouting, etc.; and I can communicate that not one cloth had to be changed; everything run as it ought to after the rolls were set to suit.

The mill has been running for the last 30 days. The yield of flour has been very nice. The flours Nos. 0, 00, 1, and 2, are of exceeding strength and sharpness, and of very good color, the percentage being very favorable indeed. The low grade flour, No. 3, is in qual-

ity equal to Milwaukee Extra; it is a great deal whiter and sharper than the low grade flour obtained by finishing up on stones. The feed and bran made are as poor as they can be gotten; and, last but not least, 100 barrels of flour were ground with but one ton of coal.

The members of the firm owning the Daisy Mill have agreed that Mr. Edw. P. Allis was to conduct the business of the firm, and he has appointed Mr. Lou R. Hurd business manager of the mill. This gentleman is well known amongst the millers through his long connection with Messrs. Edw. P. Allis & Co., lately as their traveling salesman and contractor. Mr. Hurd will be glad to receive visiting miller friends, and consider it a pleasure to show them the mill and its work. From his long connection with the roller-mill industry, and his continuous association with the leading milling engineers of the day, he is unquestionably amply qualified to occupy the responsible position of Manager in what may be considered a model mill in modern times.

NEWS.

EVERYBODY READS THIS.

ITEMS GATHERED FROM CORRESPONDENTS, TELEGRAMS AND EXCHANGES.

BURNED.—C. F. Sneek's mill at Wrightstown, Wis.

Nalle & Co., millers of Alexandria, Va., have failed.

BURNED.—Vardy & Carter's mill in Cartersville, Texas.

BURNED.—J. H. Reed's flour mill at Boone, Ia. Insured.

Kehler Bros., of St. Louis, have ordered two of Durant's Tallies.

C. W. Edwards, of Wampler, N. C., is building a custom flouring mill.

W. N. Durant, of Milwaukee, Wis., is crowded with orders for his Tally.

The Pillsbury A Mill, Minneapolis, is illuminated by the electric light.

Mayer & Johnson, of Brown's Grove, Kansas, are building a flouring mill.

BURNED.—Wm. J. White & Bro.'s mill at Warrenton, N. J. Well insured.

John Baker's mill at West Fork, Ky., is being remodeled to the new process.

B. F. Gump, of Chicago, Ill., has recently purchased one of Durant's Tallies.

Messrs. Barnard & Leas, of Moline, Ill., have ordered five of Durants' Tallies.

D. Kiefer, of Covington, Ky., is building a 150-barrel gradual reduction flouring mill.

W. B. McPike's mill at Bowling Green, Mo., is being remodeled and otherwise improved.

Dean Brothers' mill near Chester, Pa., burned July 9th. Loss \$30,000. Partially insured.

Bechtel & Ellenbaum are erecting a three-run new process steam mill near Pembina, Dakota.

H. A. Burt, of Menasha, Wis., is about to introduce the combination electric purifier in his mill.

BURNED.—July 3d, Notbohm Bro.'s mill at Janesville, Wis. Loss, \$30,000. Insurance, \$17,000.

Perry Hutchinson's grain elevator in Marysville, Kansas, was unroofed by the cyclone of June 22d.

Bates & Nevins, of Moline, Mich., are building one of the finest new process mills in the State.

Scott & Co., of Greenfield, Ind., are enlarging their mill and adding buhrs to increase their capacity.

B. C. Meyer, of Bethalto, Ill., has recently ordered twenty of Durant's Tallies for his grain weighers.

Gibson & Co., at Indianapolis, Ind., are taking out some buhrs and introducing roller mills in their stead.

Junius M. Wheeler's mill at Oronoco, Mo., is being overhauled and remodeled by the Nordyke & Marmon Co.

Part of one of Simpson & Gault's factories was damaged by fire June 9th. Loss said to be covered by insurance.

The Mazeppa Mill Co., of Mazeppa, Minn., are putting in porcelain rolls in place of their mill stones on middlings.

The mill at Friendswood, Ind., owned by Jessop & Son, is being remodeled to the latest principles of new process milling.

I. O. Mansfield, of Athens, Tenn., is getting

his new process machinery of Nordyke & Marmon Co., of Indianapolis, Ind.

Elliott's mill, at Shelbyville, Ind., is having such a demand for their fine flour that it has become necessary to double the capacity.

DIED.—The following millers have died during the past month: Paris N. Benbow, Jamestown, N. Y. Henry Ratz, Gadsbill, Ont.

Allis & Co. have over 800 hundred men on their pay roll and run night and day. They cast 50 tons per day of machinery castings.

Messrs. Woodward & Dwight, of Staunton, Ill., who had three of W. N. Durant's Tallies in use in their mill, have just ordered another one.

A new mill is going up at Macon, Mo., and the entire outfit of machinery is being furnished by Nordyke & Marmon Co., of Indianapolis, Ind.

Messrs. Gibson & Co., of Indianapolis, are putting in a full line of Gray's patent noiseless roller machines, furnished by Edw. P. Allis & Co., Milwaukee.

The building for Batty & Gaud's gradual reduction mill at Waverly, Ill., is approaching completion. Rolls will be used and the capacity will be 200 barrels.

W. D. Washburn & Co., of Anoka, Minn., are increasing their capacity and putting in a lot more of the Gray roller machines bought of Edw. P. Allis & Co.

Messrs. Schurmeier & Smith, of St. Paul, Minn., have recently taken a Government contract to furnish 50,000 pounds of flour to the Department of Dakota.

The new mill of W. H. Mitchell, of Edmonston, Ky., is having rolls and more bolting chests added which will enable him to improve his milling capacity.

Alexander Ault, of Bellaire, O., has placed his order for the machinery for a 150-barrel gradual reduction mill with Nordyke & Marmon Co., of Indianapolis, Ind.

V. M. Ayers, of Arkansas City, Kansas, is building a mill having four sets of rolls, purifiers, bolt chests and a large amount of other machinery. The mill will be driven by water power.

H. W. Lyman & Co., succeed to the business of Schumacher & Sons, in Port Washington, Wis., where they will carry on the malleable and gray iron castings business and all kinds of small castings.

The Daisy Roller Mills have just started up and are giving entire satisfaction. The Daisy is one of the neatest mills in the world, and has been built for the express purpose of showing what a model mill can do when built, arranged and run properly.

Edw. P. Allis & Co., of the Reliance Works, Milwaukee, Wis., report business something unparalleled. They have over 50 engines ordered ahead yet untouched. They are turning out 10 of the Gray Pat. Noiseless Roller Machines a day, and can hardly keep up with orders.

In a letter received recently from a representative of the Lacroix Middlings Purifier Co., of Indianapolis we are informed that they are doing a very prosperous business. The Lacroix Patent Dust Collector is meeting with great success. These Dust Collectors have already been introduced in some of the best mills in the country.

EGYPT is a small country; the fertile parts hardly exceed the area of the small State of New Jersey. The public debt of Egypt amounts to-day to \$450,000,000. The revenue of Egypt is barely \$42,500,000, and out of this \$20,000,000 has to be paid away to the creditors, and \$3,500,000 goes to the Sultan. Thus a comparatively small sum is left for other purposes. Nevertheless, Egypt seems to prosper in spite of her heavy burdens, and last year she not only paid what she was bound to pay, but she paid \$1,500,000 on her bonds. The improved credit has caused universal hopefulness as to the future of Egypt. Capital is pouring into the country; and a great number of companies for sugar-refining, irrigation, land-cultivation, jute-growing, and building purposes have been established. The money rate of interest has fallen from 12 per cent to about 5 per cent, and land which sold three years ago at \$50 per acre is now sought in vain for \$150. During three years the value of the unified-debt bonds alone has increased by \$75,000,000; and during the year 1880 the value of the consolidated-debt bonds rose from \$380,000,000 to \$400,000,000. The fiscal and financial reforms have been most thoroughly and energetically carried out, but beyond this very little has been accomplished. Commissions have been appointed to introduce reforms in the Departments of War and Public Instruction. The ex-Khedive left behind him in Egypt an army of nearly 100,000 men. Under the new regime this force was reduced to about 6,000 men; but provision for the supernumerary officers, who consider that they have a vested right to receive bed and board from the Government, still continues to be a serious embarrassment to the authorities. The only present use for an Egyptian army is to create internal commotion and emeutes.

The London Exhibition.

Through the courtesy of Mr. Dunham, publisher of the *Miller*, London, we are enabled to present to our readers the two illustrations herewith and the description following of W. R. Dell & Sons' exhibit. The *Miller* says in referring to this exhibit:

"The first of these is that of Messrs. Dell & Son, the structure of which was fully described in our last notice. AA (fig. 1) is the main driving shaft. *a* is an upright shaft extending to the extreme top of the framework and driven by a belt from shaft AA. *b*, *c*, *c* are two horizontal shafts driven by bevel gears on shaft *a*. The former carries all the elevators and drives the two American bolting chests, and the rolls and purifiers are driven from the latter. The wheat cleaning machines are driven by pulleys on upright shaft *a*. CC (fig. 1) are purifiers for coarse, and DD purifiers for fine middlings, all being the Geo. T. Smith machines. D is of a pattern never before shown here, being a combination of air and sieve purifier of the type manufactured by the Smith Company for treating the early breaks of roller mills. B (fig. 1) is the wheat run of stones four feet in diameter, with the Smith dress, and has been sent over by the Smith Company from the mills at Albion, Mich. These are the same stones that were used in the Nordyke Marmon Company's mill at the Cincinnati Exhibition last June. K is an Allis corrugated four-roll mill for cleaning bran; *d* (fig. 2) is an Allis four-roll porcelain mill. The two sets of rolls in this mill, being separated by a partition, different kinds of material will be sent to each set. Beyond these is a smooth chilled iron two-roller mill for coarse germ middlings. E, E, E, are the wheat meal reels, and F F are the middlings meal reels. G is reel for meal from smooth iron rolls, H is reel for tailings meal from one pair of the porcelain rolls, and J from the other pair. An ordinary reel will take the bran from rollers K instead of the centrifugal shown in the drawings. MN, O P, Q R, S T are elevators, by which the different varieties of material are delivered to the several machines where each is to be treated, the entire exhibit showing a complete and well-organized automatic mill, remarkable for the simplicity of the means employed in handling the material at every stage in its reduction from the moment of its entering the wheat elevator to the final discharge of the finished product into sacks. In operation the wheat is first elevated into a Barnard and Leas Oat and Weed separator Z, drops from this machine to a "Victor" smutter by the same makers, and is thence spouted to the wheat elevators, which deliver it to a "Victor" brush machine, from whence it is drawn to the wheat bin (fig. 2) over wheat stones B (fig. 1). After granulation the meal is elevated to reel E, where the coarse middlings are separated, dusted, and sent to purifier C, and the bran taken off over the tail of the reel, aspirated, and conveyed to bran rolls K. The meal, less the two portions above mentioned, now passes to reel E, from which the largest part of the "wheat" or "first" flour is drawn off into sacks. What remains is elevated to reel E, and the bolting of the wheat meal is here finished, the fine middlings coming over the tail of the reel being spouted to purifier D. The coarse middlings, after passing over purifiers C and C, are elevated to a stock hopper over stones B, on which they are afterwards ground, and the meal elevated to reel F. The fine middlings pass over purifiers C and C, and are in like manner stored in a hopper over stones B. The meal from the stones is elevated to reel F. Coarse germ middlings coming over tail of purifier C are crushed on smooth iron rolls, and the meal bolted on reel G. The tailings of reels F and F, and of purifiers C and C, are elevated to another purifier not shown in the drawings, and the purified middlings from it sent to one side of the porcelain roller mill, from whence the meal is elevated to reel H. The tailings from reel H and from the purifier last mentioned are ground on the other side of the porcelain roller mill and the meal bolted on reel J. Whoever has followed the material carefully in its course through this mill cannot have failed to be impressed with the provision that has been made to secure a close yield, no portion of the product receiving less than three, and the most valuable parts being treated to five reductions. The bolting chests are manufactured by the Messrs. Dell and Son, and are of the same type as those used in the United States. The exhibit will no doubt be examined with great interest

by the visitors, and the system it represents and illustrates is now at work in several places in this country. On the first day of the Exhibition red winter American wheat will be treated, on the second day white English,

point has a fall of 35 feet, and furnishes, at a minimum, about 10,000 horse power during the usual working hours. At Cohoes, in the State of New York, the Mohawk river has a fall of about 105 feet, which was brought into

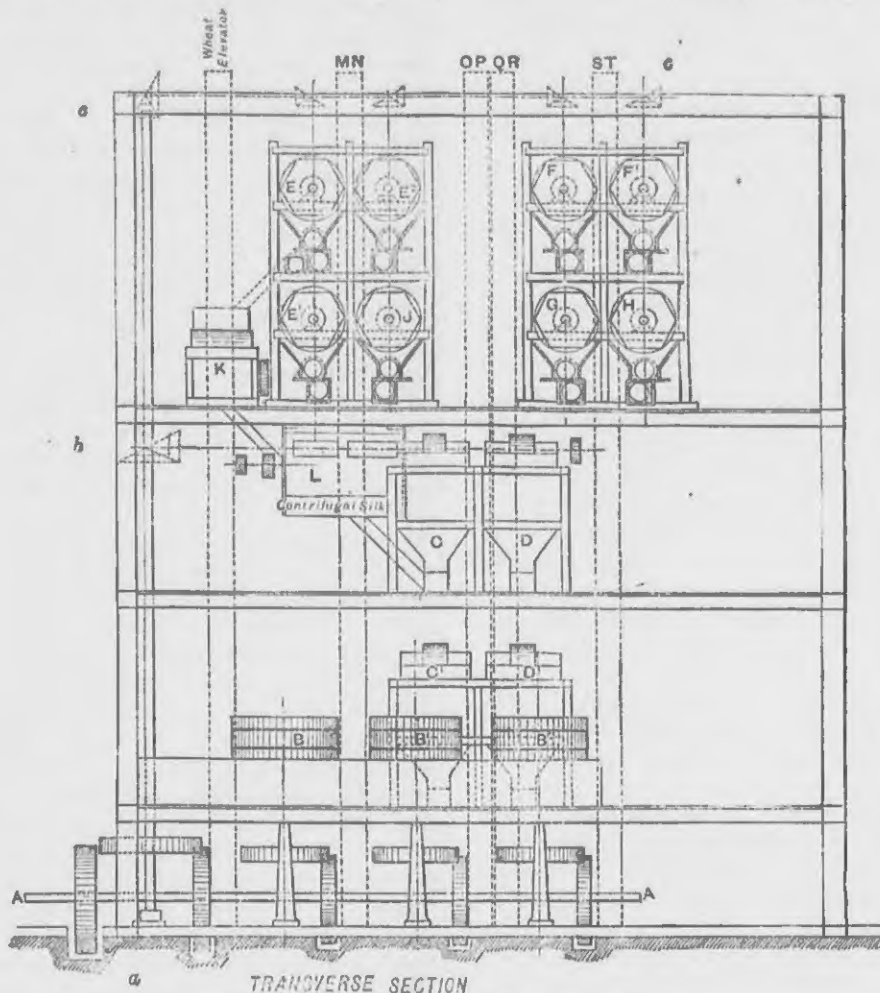


FIG. 1.—W. R. DELL & SON'S EXHIBITION MILL.

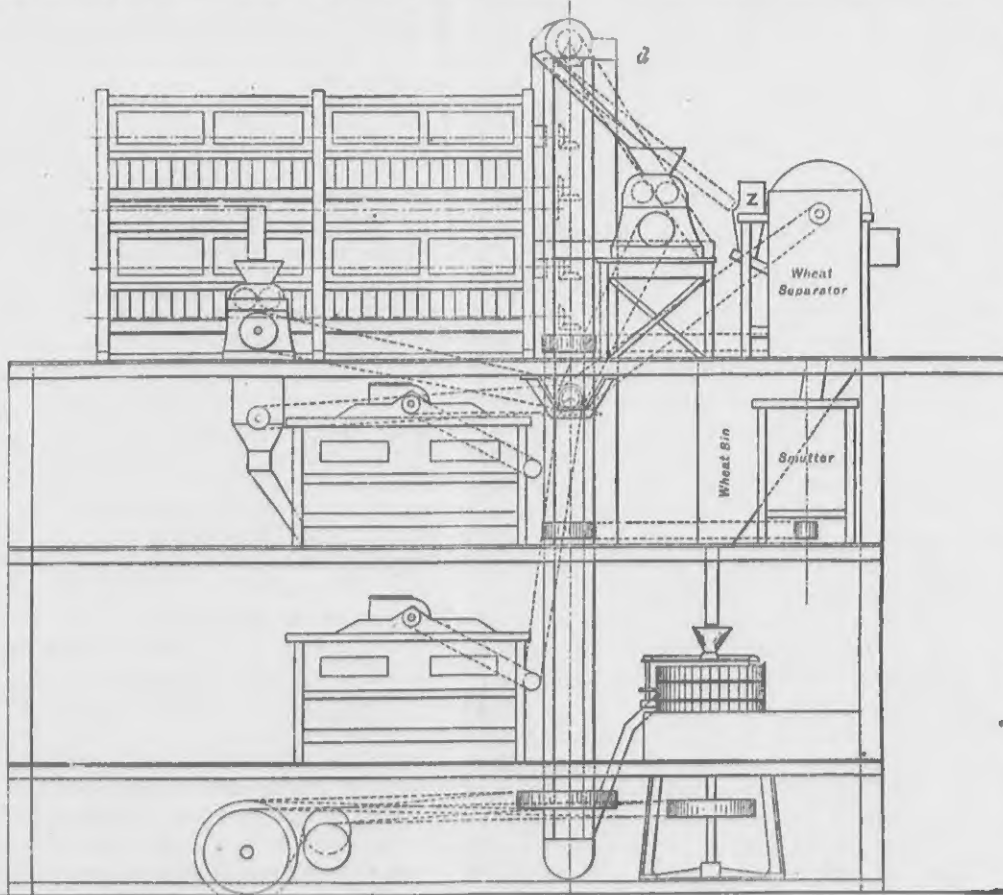
on the third day hard Minnesota, on the fourth a mixture of Bombay and Calcutta, and on the fifth in the morning red Bombay, and in the afternoon inferior red soft English wheat.

American Water Powers.

BY JAMES B. FRANCIS, C. E.

Water power in many of the States is abundant, and contributes largely to their prosperity. Its proper development calls for the services of the civil engineer, and, as it is a branch of the profession with which I am most familiar, I propose to offer a few remarks on the subject. The earliest applications were to grist and saw mills; carding and fulling mills soon followed. These were essential to

use systematically very soon after that at Lowell, and could furnish about 14,000 horse power during the usual working hours, but the works are so arranged that part of the power is not available at present. At Manchester, N. H., the present works were commenced in 1835. The Merrimac river at this point has a fall of about 53 feet, and furnishes, at a minimum, about 10,000 horse-power during the usual working hours. At Lawrence, Mass., the Essex company built a dam across the Merrimac river, commencing in 1845, and making a fall of 28 feet, and a minimum power, during the usual working hours, of about 10,000 horse-power. At Holyoke, Mass., the Hadley Falls Company commenced their works about 1845 for developing the power of the



LONGITUDINAL SECTION

FIG. 2.—W. R. DELL & SON'S EXHIBITION MILL.

the comfort of the early settlers, who relied on home industries for shelter, food and clothing; but with the progress of the country came other requirements. The earliest application of water power to general manufacturing purposes appears to have been at Patterson, N. J., where "The Society for Establishing Useful Manufactures," was formed in the year 1791. The Passaic river, at this point, furnishes, when at a minimum, about 1,100 horse-power, continuously night and day. The water power of Lowell, Mass., was begun to be improved for general manufacturing purposes in 1822. The Merrimac river at this

Connecticut river at that point, where there is a fall of about 50 feet, at a minimum of about 17,000 horse-power during the usual working hours. At Lewiston, Me., the fall in the Androscoggin river is about 50 feet; its systematic development was commenced about 1845, and with the improvement of the large natural reservoirs at the head waters of the river now in progress, it is expected that a minimum power, during the usual working hours, of 11,000 horse-power will be obtained. At Birmingham, Conn., the Housatonic Water Company have developed the water power of the Housatonic river by a dam giving 22 feet

fall, furnishing, at a minimum, about 1,000 horse-power during the usual working hours. The Dundee Water and Land Company, about 1858, developed the power of the Passaic river, at Passaic, N. J., where there is a fall of about 23 feet, giving a minimum power, during the usual working hours, of about 900 horse power. The Turner's Falls Company, in 1866, commenced the development of the power of the Connecticut river at Turner's Falls, which is about 35 feet, and furnishes a minimum power, during the working hours, of about 10,000 horse-power. I have named the above water-powers as being developed in a systematic manner from their inception, and of which I have been able to obtain some data. In the usual process of developing a large water-power, a company is formed who acquire a title to the property, embracing the land necessary for the site of a town to accommodate the population which is sure to gather around an improved water-power. The dam and canals or races are constructed, and mill sites, with accompanying rights to the use of the water, are granted, usually by perpetual leases subject to annual rents. This method of developing water-power is distinctly an American idea, and the only instance where it has been attempted abroad, that I know of, is at Bellegarde, in France, where there is a fall in the Rhone of about 33 feet.

Within the last few years, works have been constructed for its development, furnishing a large amount of power, but from the great outlay incurred in acquiring the titles to the property, and other difficulties, it has not been a financial success. The water-powers I have named are but a small fraction of the whole amount existing in the United States and the adjoining Dominion of Canada. There is Niagara with its two or three millions of horse power; the St. Lawrence with its succession of falls from Lake Ontario to Montreal; the falls of St. Anthony, at Minneapolis, and many other falls, with large volumes of water, on the upper Mississippi and its branches. It would be a long story to name even the large water-powers, and the smaller ones are almost innumerable. In the State of Maine a survey of the water-power has recently been made, the result, as stated in the official report, being "between one and two millions of horse-powers," part of which will probably not be available. There is an elevated region in the northern part of the South Atlantic States, exceeding in area 100,000 square miles, in which there is a vast amount of water-power, and being near the cotton fields, with a fine climate, free from malaria, its only needs are railways, capital and population to become a great manufacturing section. The design and construction of the works for developing a large water-power, together with the necessary arrangements for utilizing it and providing for its sub-division among the parties entitled to it, according to their respective rights, affords an extensive field for civil engineers, and, in view of the vast amount of it yet undeveloped, but which, with the increase of population, and the constantly increasing demand for mechanical power as a substitute for hand-labor must come into use, the field must continue to enlarge for a long time to come. There are many cases in which the power of a waterfall can be made available by means of compressed air, more conveniently than by the ordinary motors. The fall may be too small to be utilized by the ordinary motors; the site where the power is wanted may be too distant from the waterfall, or it may be desired to distribute the power in small amounts at distant points. A method of compressing air by means of a fall of water has been devised by Mr. Joseph E. Frizell, C. E., of St. Paul, Minn., which, from the extreme simplicity of the apparatus, promises to find useful application. The principle on which it operates is by carrying the air in small bubbles in a current of water down a vertical shaft to the depth giving the desired compression, then through a horizontal passage, in which the bubbles rise into a reservoir near the top of this passage, the water passing on and rising in another vertical or inclined passage, at the top of which it is discharged, of course at a lower level than it entered the first shaft. The formation at waterfalls is usually rock, which would enable the passages and the reservoir for collecting the compressed air to be formed by simple excavations, with no other apparatus than that required to charge the descending column of water with the bubbles of air, which can be done by throwing the air into violent commotion at its entrance, and a pipe and valve for

the delivery of the air from the reservoir. The transfer of power by electricity is one of the problems now engaging the attention of electricians, and it is now done in Europe in a small way. Sir William Thompson stated in evidence before an English Parliamentary committee, two years ago, that he looked "forward to the Falls of Niagara being extensively used for the production of light and mechanical power over a large area of North America," and that a copper wire, $\frac{1}{2}$ inch in diameter, would transmit 21,000 horse-power from Niagara to Montreal, Boston, New York or Philadelphia. His statements appear to have been based on theoretical considerations, but there is no longer any doubt as to the possibility of transferring power in this manner; its practicability for industrial purposes must be determined by trial. Dr. Paget Higgs, a distinguished English electrician, is now experimenting upon it in the city of New York. Great improvements in reaction water wheels have been made in the United States within the last 40 years. In the year 1843 the late Uriah Atherton Boyden, a civil engineer, of Massachusetts, commenced the design and construction of Fournayron turbines, in which he introduced various improvements and a general perfection of form and workmanship which enabled a larger percentage of the theoretical power of the water to be utilized than had been previously obtained. The great results obtained by Boyden with water wheels, made in his perfect manner, and in some instances, almost regardless of cost, undoubtedly stimulated others to attempt to approximate to those results at less cost, and there are now many forms of wheel at low cost, giving fully double the power, with the same consumption of water that was obtained from most of the other forms of wheels of the same class.

A frequent inconvenience in the use of water-power in cold climates is that peculiar form of ice called anchor or ground ice. It adheres, to stones, gravel, wood and other substances forming the beds of streams, the channels and conduits of orifices through which water is drawn; sometimes raising the level of water courses many feet by its accumulation on the bed, and entirely closing small orifices through which water is drawn for industrial purposes. I have been for many years in a position to observe its effects and the conditions under which it is formed. The essential conditions are that the temperature of the water is at its freezing point, and that of the air below that point; the surface of the water must be exposed to the air and there must be a current in the water. The ice is formed in small needles on the surface, which would remain there and form a sheet if the surface was not too much agitated by a current or movement in the body of water sufficient to maintain it in a constant state of intermixture. Even when flowing in a regular channel there is a continued interchange of position of the different parts of a stream; the retardation of the bed causes variations in the velocity, which produce whirls and eddies and a general instability in the movement of the water in different parts of the section, the result being that the water at the bottom soon finds its way to the surface and the reverse.

I found by experiments on straight canals, in earth and masonry, that colored water discharged at the bottom reached the surface at distances varying from 10 to 30 times the depth. In natural water-courses, in which the beds are always more or less irregular, the disturbance would be much greater. The result is that the water at the surface of a running stream does not remain there, and when it leaves the surface it carries with it the needles of ice, the specific gravity of which differ but little from that of the water, which, combined with their small size, allows them to be carried by the current of water in any direction. The converse effect takes place in muddy streams. The mud is apparently held in suspension, but is only prevented from subsiding by the constant intermixture of the different parts of the stream; when the current ceases the mud sinks to the bottom; the earthy particles composing it, being heavier than water, would sink in still water in times inversely proportional to their size and specific gravity. This, I think, is a satisfactory explanation of the manner in which the ice formed at the surface finds its way to the bottom. Its adherence to the bottom, I think, is explained by the phenomenon of regelation first observed by Faraday. He found that when the wetted surface of two pieces of ice were pressed together they froze together, and that this took place under water, even when above the freezing point. Prof. J. O. Forbes

found that the same thing occurred by mere contact with pressure, and that ice would become attached to other substances in a similar manner. Regelation was observed by these philosophers in carefully arranged experiments with prepared surfaces, fitting together accurately, and kept in contact sufficiently long to allow the freezing together to take place.

In nature these favorable conditions would seldom occur in the masses of ice commonly observed, but we must admit, on the evidence of the recorded experiments, that, under particular circumstances, pieces of ice will freeze together or adhere to other substances in situations where there can be no abstraction of heat. When a piece of ice of considerable size comes in contact under water with ice or other substance, it would usually touch in an area very small in proportion to its mass, and other forces acting upon it, and tending to move it, would usually exceed the freezing force, and regelation would not take place. In the minute needles formed at the surface of the water the tendency to adhere would be much the same as in larger masses touching at points only, while the external forces acting upon them would be extremely small in proportion, and regelation would often occur, and of the immense number of the needles of ice formed at the surface, enough would adhere to produce the effect which we observe and call anchor ice. The adherence of the ice to the bed of the stream or other objects is always down stream from the place where they are formed; in large streams it is frequently many miles below; a large part of them do not become fixed, but as they come in contact with each other regelate and form spongy masses, often of considerable size, which drift along with the current and are often troublesome impediments to the use of water-power. Water power supplied directly from ponds or rivers or canals, frozen over for a long distance immediately above the places from which the water is drawn, are not usually troubled with anchor ice, which, as I have stated, requires open water, up-stream, for its formation.

THE IMPORTS OF GRAIN AND FLOUR.—Mr. Talbot has obtained a statistical return showing the quantities of grain and flour imported into the United Kingdom from 1820 to 1827, and from 1828 to 1880, together with the average prices of meat, wool, and other produce for the same periods. In 1820 the total importation of wheat, barley, and oats was, in round numbers, 4,500,000 cwt. Next year, owing to the good harvest, it fell to 900,000 cwt., then to 400,000, and in 1823 the quantity imported was only 144,000 cwt., after which it began steadily to rise year by year until, in 1827, the importation stood at nearly seven millions of cwt. In 1828 there was again a fall to four and a quarter millions; and for the next thirty years there were great fluctuations, the imports of grain and flour sometimes falling as low as a million cwt., and sometimes rising to over forty millions. The steady increase began in 1866, when the imports were nearly sixty-three millions, and the quantity has risen until, in the year 1880, it stood at over one hundred and thirty-four millions of cwt., of which forty-five millions were wheat and thirty-seven millions maize. The figures relating to the prices of meat and other commodities are too intricate to be analyzed with advantage; but it may be said that the increase in prices has been almost constant, amounting in the case of meat to nearly 40 per cent wholesale.—*The Farmer (London.)*

A CALIFORNIA BAG FACTORY.—A correspondent of the *San Rafael Journal* gives the latest information on the subject. It says that the new factory is a building 240 ft. long by 140 ft. wide, of brick, one story high with concrete floor, to hold machinery consisting of 100 looms and 44 other machines, such as spinning frames, dressers, warp winders, dry spinners, dampers, measurers, sack cutters, and finishers. All these are for the manufacture of jute burlaps from the raw material, which at present must be imported from Calcutta, and of which 500 tons have already arrived and are in store at San Francisco. The building now in course of construction will have an inside frame work of heavy trussed timbers with gable roofs, running laterally, and to be covered with tin. The machinery, which has been manufactured in England, is due at San Francisco the latter part of this month, and there is no doubt but that by the last part of September, the factory will be in full operation and giving steady work to 400 prisoners.

SUBSCRIBE for the U. S. MILLER.

The Cincinnati Engine Tests.

AN OPEN LETTER FROM EDWIN REYNOLDS, SUP'T RELIANCE WORKS, MILWAUKEE, TO JEROME WHELOCK, WORCESTER, MASS.

Jerome Wheelock, Esq., Worcester, Mass.:

DEAR SIR—Your printed letter to Hon. Geo. E. Gault, of June 11th, received and noted. While the Cincinnati Engine may not have been cut at the pillow block, I think you will not deny having built many in that way. This, however, has no bearing on the report which has called out this discussion. As you seem to be anxious to have the facts stated, allow me to assist you a little in that direction. You say, "perhaps he forgets that he has been making use of this matter and the statements of the expert to show the superiority of his engine over the Wheelock regarding relative weights." You are entirely wrong in the inference you would have people draw from this negative statement, as I did not criticize the weight of the engine, but your statement of its weight which appeared in the expert's report. What I did say was, "That the weight as given is incorrect, must be plainly evident to any engineer at all familiar with the proportions and construction of such engines," and made no allusion to the actual weight of the engine whatever in my first letter, and only referred to the weight of the wheel in my second, as affecting the friction and motion of the engine. In your printed letter of May 7th, after stating you were "audaciously and unexpectedly called upon to be tried," you say, "not once had we tried our condenser." I left Cincinnati June 19th, and certainly saw your condenser in successful operation before I left. As I was not there after that date, and as your trial did not commence until June 25th, I think your statement slightly erroneous as to matter of fact; but to get at the real essence of your system of stating facts, I will call your attention to your printed letter of May 7th, in which you attempt to prove your engine superior to mine in regulation during condensing test. You say, "The regulation of the various engines was demonstrated in the economy tests as follows:

	Reynolds.	Harris.	Wheelock.
Average revolutions per minute.....	75.383	75.330	74.472
Maximum revolutions per minute.....	76.130	77.130	74.030
Minimum revolutions per minute.....	75.060	74.800	74.070

Now let us look at the expert's report and see how near you come to telling the truth in this matter. See page 35, June 25th, 4:00 A.M.:

Average revolutions for preceding 15 minutes.....	75.20
Also same page, time 8:30 A.M.:	
Average revolutions for preceding 15 minutes.....	73.93

But to make these figures more convenient for your comparison, suppose we arrange them in this form:

Wheelock's statement of his maximum speed condensing test.....	74.93
Wheelock's maximum speed (expert's report condensing test).....	75.20
Difference between Wheelock's statement and the fact.....	.27
Wheelock's statement of his minimum speed.....	74.07
Wheelock's minimum speed (expert's report).....	73.93
The difference between Wheelock's statement and the fact.....	.14
Wheelock's statement of difference between his average and maximum.....	.458
Wheelock's actual difference between average and maximum.....	.728
Difference between Wheelock's statement and the fact.....	.270
Wheelock's statement of difference between his average and minimum.....	.402
Wheelock's actual difference between average and minimum.....	.542
Difference between Wheelock's statement and the fact.....	.140
Wheelock's statement of his average variation from average speed.....	.430
Wheelock's actual variation from average speed as shown by expert's report.....	.635
Difference between Wheelock's statement and the fact.....	.205

Which makes the comparison:

	Reynolds.	Wheelock.
Average variation from average speed.....	.535	.635
Wheelock's statement.....	.535	.430
Difference between Wheelock's statement and the fact.....		.205

It would be charitable to call your misstatements of the figures of the report clerical errors, but as you have quoted the extreme variations of both competing engines with an accuracy quite commendable, and scattered the false statements of the performance of your engine over the country, I cannot allow you to escape the honor of having falsified the record of your own engine by misstating both its maximum and minimum speeds and the consequent misstatement of the comparisons based on these false figures.

I am not at all surprised at the complacency with which you "await the results of Prof. Grimshaw's investigations," as long prior to the reference of the expert's report to him, he stated to the builder of the Reynolds engine that he was under contract with you to illustrate and advertise your engine in his work on milling, to the exclusion of all others.

I cheerfully concede to the engine and its

builder all honor implied by such a record.

Very truly yours, EDWIN REYNOLDS,
MILWAUKEE, July 12th, 1881.

Flour Mill Queries.

[A Series of Questions Propounded and Answered by EPHESSIA, a regular contributor to the UNITED STATES MILLER.]

What is the best shape for a cockhead?

ANS.—Say a spherical bearing point fitting in the cockheads about the distance or arc of the circle amounting to one-third, from thence the gradual relief of the same to one-half a circle, or in other words, an absolute circular fit in one-half to one-third of a circle and from thence slightly relieved, allowing the stone to oscillate freely upon this suspension point and at the same time without having any lateral play whatever.

What is the proper length of a spindle and of what material should it be made?

ANS.—Most makers prefer a spindle of the best hammered wrought iron with self-oiling bearings, so that the body of the spindle will retain the same temperature as nearly as possible while in use. The length depends upon the size of stone. For a forty-two inch stone, the average length preferred, and which gives the best results, is 6 to 8 feet.

What material is best to use in the construction of curbs; which are best, bent or stave?

ANS.—Good builders make them of pine staves, which are made on a special machine with steel mandrils and cutter heads standing at radial lines, which are adjustable at the proper angle for the different diameters of curbs, with staves to be grooved by this device, and in putting them together use white lead thinned with oil, then keep the inside of the curbs well painted with any good lead paint. The upper part of the curbs they make of pine, double thickness, grooved, and said grooves filled with tongues, having the grain of the wood running lengthwise with that of the wood as near as possible. The curbs finished with walnut bands, which have under them light iron bands to hold more securely.

Ought there be any difference in the furrows of the upper or runner stone and those of the bed; if so, what?

ANS.—Practical millers think the furrows in the upper stone should be about the same throughout as those in the bed stone, except those in the runner are made somewhat deeper. The furrows in the bed-stone incline to fill up in grinding, owing to the gravity of the material being ground, so that it is useless to make them as deep as those in the runner.

Should furrows have parallel sides or taper; of the same depth from eye to skirt, or different?

ANS.—One long-established firm prefer and make the furrows in their millstones with parallel sides or edges, and somewhat deeper at the eye than the skirt. This facilitates the use of diamond machines in keeping them in proper shape; the diamond machines being used to work about one-half to two-thirds the width on inclined side of the furrow from the feather or cutting edge.

In order to do good work with the purifier, should the silk be taut or loose upon the screen frames?

ANS.—As tight by and evenly stretched as possible.

What methods have been proposed to help the bolting?

ANS.—One method is by purification of the wheat meal as it comes from the chop.

What process would be likely to help the middlings purifier?

ANS.—Giving the wheat meal a purification when it leaves the stone.

What will be the average cost for turbine, flumes, &c., for 6 to 8 feet head? ANS.—About \$200 per horse-power.

What would be the cost with 18 feet head? ANS.—About \$50 per horse-power.

How do you measure the water-power of a water-fall? ANS.—By the product of its height by the water passing. This product is 550 foot pounds per second per horse-power.

With one foot fall, how many cubic feet of water per second will give one horse-power net? ANS.—With an efficiency of 0.7, and one foot fall, 127 cubic feet of water. With 101.6 feet fall, $\frac{1}{2}$ of a cubic foot of water per second, or 7.5 per minute, would give one horse-power.

How should lead be put in for weighting millstones, in balancing?

ANS.—Always by melting and running it in; never hammering in the cold lead in again.

What is the reason it will not do to hammer this cold lead in again?

ANS.—Because it is very apt to work loose and fly out and do harm, and throw the stone out of running balance.

Which is the most difficult to balance, an under runner or an upper runner?

ANS.—The under runner. Because the pivot of the cockhead is generally too high above the centre of gravity.

Should an under runner with loose cockhead be balanced on the driver or not?

ANS.—Most decidedly no. There should be pivot made for it and it should be balanced upon this pivot, the same as a pulley or a fly-wheel.

Suppose there is no place to run any lead in an under runner?

ANS.—Take a piece of iron about $\frac{1}{2}$ inch thick and $1\frac{1}{2}$ to 1 $\frac{3}{4}$ inches wide, and make of this a hoop a little larger than the stone, so as to leave about $\frac{1}{2}$ inch all around between the hoop and the stone. Wedge this out by wooden wedges so as to stand concentric with the stone, or not, as desired. A better way is to make the hoop with a bolt through two lugs at the ends.

Christian Drummers.

One of the travelers for a New York dry goods house, says an exchange, recently arrived in an interior State to find that one of his best customers was about to transfer his custom to a Boston firm.

"Didn't we always do well by you?" asked the New Yorker as he sat down for an explanation.

"Yes, I believe so."

"Didn't we ship goods to you promptly?"

"Yes."

"And did we ever press you an inch?"

"No, I can't say that you did."

"We can't understand why you should leave our house all of a sudden, after buying of us for several years."

"I should make some explanation, and I will make one," replied the merchant. "You know that I attend church?"

"Yes, and so do I."

"Do you? I didn't know that. I am looked upon as a Christian."

"So am I. I have got the date of my baptism right here in my note-book."

"Is that so? Well, our church is in need of repairs. We were talking it over the day when the Boston drummer was in here, and he at once subscribed ten dollars."

"Ten dollars! Why, that's only two kegs of nails! Put me down for \$30 cash, a new silk hat, and a new suit of clothes for the minister."

"Do you mean it?"

"Of course I do, and if that two-cent Christian from Boston dares give another \$5, I'll send you down a \$600 church organ and a \$500 man a year to play on it. We are a house that never make any great display of gospel hymns and religious tracts, but when a Boston drummer bluffs, we show our religious hand, and scoop in the pot every time."

The merchant still continues to deal with the New York firm.

I Vash Go To Mill.

Many years ago we heard an old farmer, residing near North Prairie, Waukesha county, Wisconsin, relate an incident about going to mill in very early days in Columbia county, New York. The "Mohawk Dutchmen," as the settlers in the Mohawk Valley were called, in no way showed their phlegmatic natures, so much, as in the contrast with Americans, who, when they met on the road, would chat, ask the time of day, "how's your folks?" etc. The Mohawkers would pass each other perfectly reticent. A couple of "Young Mohawkers," as the story went, made up their minds to play "Yankee," for once, and next time they met to talk as Yankees did. A few days after Hans and Jacob met on the road near a house, whose inmates overheard the following:

Hans—"Yacob."

Yacob—"Vell, Hans!"

Hans—"Vere vos you going the oder day ven you vas go to mill?"

Yacob—(After a few moment's hesitation.) "Vell, I vos go to mill!"

Hans—"Yah; Yacob! but vot vos you got in dose bags vot vos got rye in?"

Yacob—(Hesitatingly.) "Vell, I vos got rye in dose bags."

A pause followed this valuable information. At last Hans started it again.

Hans—"Yacob, I didn't you see till you vos got out of sight, eh?"

Yacob—"Yah; don't it."

Hans—"Adieu."

Yacob—"Adieu."

So the parties went their respective ways, satisfied with their first attempt to play "Yankee."—Written for the United States Miller by J. W. Hinton.

SUBSCRIBE for the U. S. MILLER.

Graphite as a Lubricant.

[Written expressly for the UNITED STATES MILLER.]

Graphite is widely scattered all over the world. It is found associated with the oldest rocks, generally of igneous origin, such as quartz, granite, &c.

There are two or three distinct varieties which may be classified as laminated, crystalline or granular, and amorphous.

These varieties are all alike in their general physical qualities, being almost non-oxidizable, resisting high degree of heat, and remaining unchanged under the action of acids.

There are three principal sources from which graphite is obtained for commercial purposes: Germany, the Island of Ceylon and Ticonderoga, New York State.

That variety obtained from Ceylon is soft, fine, smooth and unctuous, and either crystalline or granulated in structure. It is very free from grit, and mostly used in the manufacture of so-called lead-pencils, being mixed with various percentages of clay, imported from Germany for this purpose.

The laminated or foliated variety, such as occurs in Ticonderoga and Germany, is smooth, much harder, tougher and better adapted to lubricating purposes.

The work to be performed by a lubricant should regulate its composition. Different machines, or parts of the same machine, require different kinds of lubricants. Steam cylinders, for instance, requiring heavy lubricants, having high flashing and burning points, while for air compressors, light mineral oils answer the best.

In preparing graphite lubricants the oil or grease with which it is mixed varies with the work to be performed. Certain properties are taken into consideration in compounding lubricants of graphite, of which size of the flakes, purity and toughness are the principal. It must be perfectly free from grit, as if not it will cause friction and injure the rubbing surfaces. It must be tough as its wearing quality depends on this quality and the size of the particles.

We may divide graphite lubricants into two classes, dry and wet.

Dry lubricants are simply the black-lead freed from every trace of grit and powdered sufficiently to suit the special application. It is of itself one of the smoothest substances known and greatly decreases the heating of the bearings.

For millstone spindle steps, this will be found equal to any known lubricant.

When used dry for wooden bearings it coats them with a bright metallic jacket, effectually preventing wear and greatly decreasing their liability to heat.

It is usual, however, to mix it with some of the animal or vegetable lubricants. Palm oil, and tallow, probably, give the most satisfaction. Other lubricants may be used as vehicles, but those named yield the best results under most conditions.

In grease preparations, just enough is added to form a paste of the graphite. When oil is used the liquid is saturated, not too much being added to cause deposit.

When the work is heavy the grease mixture will be found the best. In heavy grinding mills heretofore great difficulty has been encountered in keeping the mill running. By judicious use of graphite grease, this trouble may be readily overcome.

For lighter classes of machinery, such as smelters, separators and brush machinery, mixtures of palm oil or other high grade lubricating oils will be found to give the most satisfaction. For steam cylinders, especially those of blowing engines, dry graphite is recommended. When the cylinder becomes perfectly coated with this substance, the friction will be reduced to a minimum.

Sometimes it is mixed with steam cylinder oil, but the dry graphite answers every purpose.

We would like to say a word here about bearings. Much has been said on this subject, and many different metals claimed to diminish friction, among which phosphor-bronze, and babbitt stand prominent. We think that cast iron bearings, highly polished, and lubricated with the first quality of graphite will yield equally good results with either babbitt or phosphor-bronze.

Where oil cups, having small apertures are used, lubricating with graphite mixtures is difficult, as the small particles of graphite choke the outlet.

It is probable that when lubrication by graphite becomes more common, suitable oil cups will be invented to supersede those now in use, and this obstacle done away with.

EPHESUS.

Electric Power.

The electric tramway which Dr. Werner Siemens has constructed in Berlin between the suburb of Lichtenfeld and the Cadetten-house is now regularly opened for passengers, and is giving great satisfaction. The rails are of the ordinary railway pattern, but the gauge is only 3 feet 8 inches. A single car is propelled by the current at an average speed of nine miles an hour, though this rate can be doubled if necessary. A similar line has been erected at the Crystal Palace, Sydenham, as an attraction for visitors, but it is probable that electric tramways will be practically introduced into this country before many years are past. Velocipedes are now so common that it is not surprising to find that electricity has been applied to their propulsion. M. Trouve, the well-known French electrician, recently drove an English tricycle through the streets of Paris by means of electricity stored in a Plante secondary battery and a pair of Deprez electric motors. The tricycle with its occupant and apparatus weighed 400 pounds, and went at the speed of an ordinary cab; but with some modification of the apparatus M. Trouve hopes to attain a rate of twelve or fifteen miles an hour. The new secondary battery of M. Faure will also help his purpose, and we may anticipate that velocipedes driven by electric power will by and by prove useful to the invalid or the weakly. In Paris, too, electricity has been applied to work an air compressor at the toy balloon factory of MM. Chauchard et Cie, behind the Hotel du Louvre. The spare steam power of the engines has been utilized by two Gramme machines, one of which generates the current and the other transforms it into mechanical work. The energy thus transmitted is about a horsepower per minute.

The Hungarian Process in Canada.

THE MARCH OF IMPROVEMENT IN MILLING—THE ENTERPRISE OF A CANADIAN FIRM OF MILLERS.

It always affords us pleasure to record the progress and development of the various industries of the country. Every addition to the industrial activity and prosperity of the Dominion is a matter for congratulation, in which every right-minded citizen may properly share. There is no industry in Canada which has made greater strides towards the goal of perfection than that of milling, and our millers have reason to feel proud of their achievements. Foremost in the ranks of Canadian millers, the well-known and successful firm of A. W. Ogilvie & Co., of this city, has stood for many years. The time is not long since a radical and almost entire change has taken place in the process of reducing wheat and flour in this country. The rapidity with which the millers of this continent have adopted the most recent improvements in manufacturing flour have placed their productions on a par with the hitherto unrivalled Hungarian flour. The Messrs. Ogilvie, whose enterprise is proverbial, have not been behind their great American competitors. They have twice visited Hungary to acquaint themselves, by personal study and inspection, with the Hungarian process. These visits resulted in their being convinced of the superiority of the roller process over the burr-stones, and some months ago they began the expensive operation of changing their Glenora Mills to the Hungarian or gradual reduction principle. The rebuilding has been accomplished at a cost of about \$50,000, and the result is one of the best equipped mills on this continent. The mill was designed by Mr. W. D. Gray, of the firm of E. P. Allis & Co., of Milwaukee, and reflects great credit on his skill and ability, and the extensive machinery is from the shops of the same firm, and from the works of Mr. John McDougall in this city. The building operations were personally superintended by Mr. George V. Hastings, of E. P. Allis & Co., and the successful manner in which so large an amount of entirely new machinery has been started places Mr. Hastings in the front rank of American millwrights. One has only to see the mill and walk through flat after flat of its intricate and extensive machinery to appreciate the extent of such an undertaking and the credit that belongs to its accomplishment. The proof that Mr. Hastings has performed his difficult task well is in the fact that the mill, since it was first put in motion, has run without a hitch. The mill is in charge of E. H. Kendall, who ran the first roller machine started in America in the experimental mill in Minneapolis. Mr. Kendall has contributed a great deal to bringing the roller process to its present perfection, and was formerly head miller of the Anoka Mill, "Governor Washburn's," of Minneapolis. He is well pleased with the Glenora, and is making flour equal if

not superior to the best Minneapolis or Hungarian. The mill contains 65 pairs of Gray's noiseless roller machines, 18 Gray's middlings purifiers, 16 Consolidated Middlings Purifiers, 4 Gray's aspirators, 2 Sturtevant suction fans, 4 United States bran dusters, 70 bolting reels, 40 elevators containing 4,080 feet, 1,120 spouts, 3 Mattison flour packers, 3,550 feet of conveyors, and 5,840 feet of belting. The machinery for cleaning wheat is in a separate building and consists of four Barnard & Loess separators, two Ingraham & Beard smut machines, two Richmond brush machines, one four-cylinder Kurth cookle machine. The capacity of the mill is 750 barrels per day, and the total cost of the change from mill-stones to rollers, as we said before, was \$50,000. Adjoining the Glenora is the Cornmeal, Feed and Barley mill, containing six run of stones and two barley mills with a capacity of 500 barrels per day. Messrs. Ogilvie & Co. are so well pleased with the success of the Glenora under the new process that they have decided to build a mill of the same size and capacity on the same principle at Winnipeg, Manitoba, which they expect to have completed and in operation by the end of the present year.—*Montreal Herald.*

Great Lines of Railway.

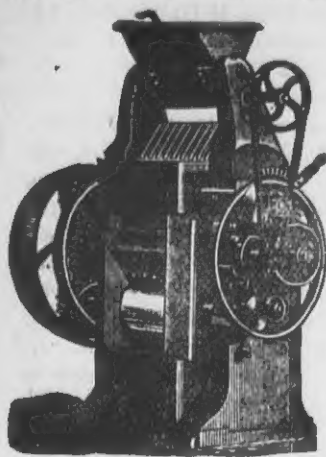
There are now in the United States sixteen railroad companies, each of which controls and operates more than one thousand miles of road. The Chicago, Milwaukee and St. Paul, which has 3,627 miles, is the longest of all, although its debt is comparatively small. The Union Pacific, with a debt nearly three times as large, but with only about half as much track, reports net earnings nearly five times as large as the St. Paul Road. The New York Central is the most profitable road per mile reported, although the Erie follows it more closely than people generally suppose. The following table presents some interesting figures:

COMPANIES.	No. miles.	Gross earnings.	Net earnings.	Debt.
Balt. & Ohio.....	1,449	\$18,317,740	\$ 7,086,970	\$8,059,376
At. T. & S. Fe.....	1,591	8,643,185	.....	28,759,200
Central Pacific.....	2,586	20,410,424	.....	84,885,690
Chi. & Alton.....	1,031	7,681,225	3,652,402	13,081,950
Chi. Bur. & Quin.....	3,105	20,492,045	10,687,552	54,418,735
Chi. Mil. & St. P.....	3,627	18,086,118	5,348,792	41,849,500
Chi. & Northw.....	2,513	17,349,349	8,917,750	39,115,000
Illinois Central.....	1,287	8,304,811	3,747,533	12,000,000
L. S. & Mich. S.....	1,177	18,720,000	8,310,000	87,980,000
N. Y. Central.....	1,000	33,175,913	16,569,219	39,733,983
N. Y., L. E. & W.....	1,009	18,993,109	7,040,184	70,178,744
Northern Pac.....	988	2,230,181	.....	25,404,096
Union Pacific.....	1,825	.....	12,428,111	42,004,858
W. St. L. & Pac.....	2,479	7,435,343	3,227,043	43,862,970
Louisv. & Nash.....	2,378	.....	.....	.....
Chi. R. I. & Pac.....	1,348	11,061,693	5,263,116	15,060,000

EFFECTS OF STRIKES.—The Chicago Tribune expresses sensible sentiments as to the effects of strikes in the following: "If the railroad strike should come, as predicted, it would probably cause a collapse in the stock market. The fancy speculative lines would first be knocked in the head, and in sympathy with them investment securities would decline. If the strike should become general, and be prolonged, it would produce considerable stringency in the money markets, and might inaugurate a panic. Retrenchment would then become the order of the hour. The railroads, as we have already pointed out, would be the first to reduce expenses, but all other kinds of business might be compelled eventually to follow their lead. Workmen dismissed from one kind of employment would not find employment in another; but the number of the unemployed would be swelled, as in 1873, from a hundred different sources. Iron and steel men would first feel the effects of contraction; then would come the coal miners, the middle men, the merchants, and even the farmers. It would be wise for the railroad men to look at all sides of the question before they precipitate a strike that may have consequences fraught with peril to themselves as well as to all other classes in the community."

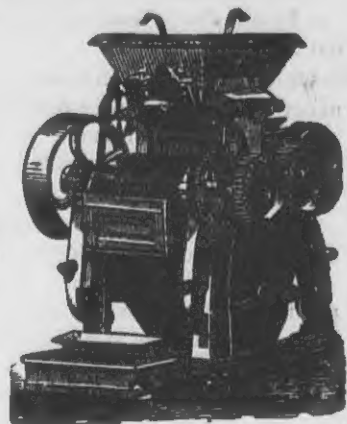
MEASURING BUILDING MATERIALS.—The following figures are worth remembering, as they will save a great deal of calculation and give approximately accurate results with a minimum of labor. A cord of stone, three bushels of lime and a cubic yard of sand will lay 100 cubic feet of wall. Five courses of brick will lay one foot in height on a chimney. Nine bricks in a course will make a flue 8 inches wide and 20 inches long, and eight bricks in a course will make a flue 8 inches wide and 16 inches long. Eight bushels of good lime, sixteen bushels of sand and one bushel of hair will make enough mortar to plaster 100 square yards. One-fifth more siding and flooring is needed than the number of square feet of surface to be covered, because of the lap in the siding and matching of the floor. One thousand lathes will cover seventy yards of surface, and eleven pounds of lath nails will nail them on. One thousand shingles laid four inches to the weather will cover over 100 square feet of surface, and five pounds of shingle nails will fasten them on.

VIENNA EXHIBITION. 1873, Awarded Diploma of Honor.

PARIS EXHIBITION, 1878, Awarded 2nd Gold Medals and 1 Silver Medal.

GANZ & CO., Iron Foundry and Manufacturing Association,

Buda-Pesth, Hungary; or Ratibor, Germany.



We take this method of recommending to the American milling public our PATENT ROLLER MILLS with chilled cast iron rollers, for crushing and grinding wheat, which have met with such eminent success in Europe. The mill-owners of BUDA-PESTH, as well as the prominent millers of Austro-Hungary, and a large number in Southern Germany, Switzerland and England, have provided for their mills the celebrated GANZ ROLLER MILLS, which are about to supplant entirely grinding on mill-stones, their working being more perfect, producing more white flour, requiring less power than the best mill-stone, and wanting no repairs excepting to occasionally replace a bearing. We have introduced into the art of milling these Roller Mills with chilled cast iron rollers, and from 1874 to January, 1879, we have delivered in the different European countries, Africa and the United States of America about 2,100 mills, and all work satisfactorily. Our crushing mills may now be regarded as absolutely necessary for every well-furnished modern mill, and this is proven by the numerous testimonials at hand. Our grinding mills are remarkable for their absolute discharge bearings, by means of the newly-devised Anti-Friction Pressure Rings. These Rings allow a very high pressure, and hence assure the performance of a great deal of work, avoiding all waste of power caused in other machines by friction in the bearings.

Out of numerous testimonials at hand we select the following:

BUDA-PESTH, March 28, 1878.—To Messrs. Ganz & Co., Foundry and Engineering Co., Limited, Buda-Pesth: Complying with your request to communicate to you my experience with your Roller material, I have pleasure in stating that I consider it, i. e., your generally well-famed chilled iron, as the best within my experience, and its adoption has satisfied me in every respect, so that I do not hesitate to assert, by introducing it on a large scale, you have rendered a considerable service to the milling art. Your material is equally well adapted for rough grinding, softening or grinding. Owing to its great hardness I cannot characterize it otherwise than indestructible. The grooved cracking rollers have demonstrated this hardness, as also a toughness, of your castings in a manner which astonishes all who know the rapid wear of cutting edges used in the treatment of grain. Your smooth rollers, once properly ground, preserve their complete cylindrical form, and do not require any repairs for a period which even now cannot be estimated. They acquire, soon after being put to work, a finely-gritted surface texture, eminently adapted for grinding as well as for drawing down the meal, a condition which they preserve without change. It is quite superfluous to prove that there can be absolutely no question of discoloring unless with reference to new rollers, to which some remnants of oil, emery or other matter may yet adhere. The flour produced by your Chilled-Iron Rollers is very lively and has remarkable baking qualities. While stating the above to the best of my conviction in answer to your inquiry, I seize with pleasure this opportunity to express to you my thorough approbation, not only of your roller material, but also generally of your roller mill construction. Your rough grinding (cracking) with chilled-iron roller mills constitutes such an essential step in advance as compared to the rough grinding with stones, that they cannot fail to win their way into every well-built mill, working on the high or half-high grinding system. For the purposes of reduction to flour you have lately erected a form of mill which I consider extraordinarily successful. You have by the introduction of an entirely new mechanical organ, i. e., the Rotary Anti-Friction Spring Pressure Ring, solved the problem of discharged bearings, which has so often been raised and as often dropped again unanswered. You have achieved success with decided aptitude in a manner as wondrous as it is simple and practical. This Roller Mill absorbs, in fact, only just the power required for the reduction into flour, and none for bearing friction which, usually, as is well known, amounts to a high figure. This Flour Mill receives an agreeable and light form while attaining a capacity hitherto unknown. In handing you the above communication for use as you may deem desirable, I remain, etc.,

(Signed) C. HAGGENMACHER, Director of the First Ofen-Pesth Steam Mills.

TIVOLI KUNSTMUEHLE, Munich, April 5, 1878.—To Messrs. Ganz & Co., Engineers, Buda-Pesth—Dear Sirs: In reply to your esteemed of March 28, we have pleasure in testifying to our satisfaction with the Chilled-Iron Rollers

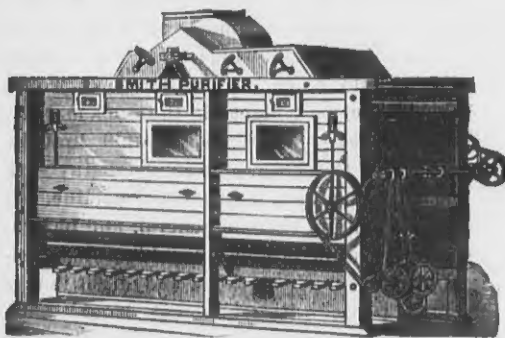
Address all communications to

GANZ & CO., Buda-Pesth, Hungary.

Cable Address "GANZ, Kaiserbad."

Or GANZ & CO., Ratibor, Germany.

[Mention this paper when you write us.]



SIMPLE, DURABLE, ECONOMICAL. Cheaper than any other of equal capacity. Licensed under all patents owned by Consolidated Middlings Purifier Co. Eight sizes single and three sizes double machines.

THE GEO. T. SMITH MIDLINGS PURIFIER

Was awarded THE HIGHEST PRIZE ever offered for the competition of milling machinery—THE LOCKWOOD MEDAL—at the great Exposition. Competition and comparison with every other known Purifier only established it more firmly in the esteem and approval of millers and mill-owners.

It was UNANIMOUSLY awarded the FIRST PREMIUM in its class by a jury of five of the ablest, most successful and experienced mill-owners in the United States, men who represented the milling of every variety of wheat, and the use of all the latest and most approved methods of new process and gradual reduction milling.

Our sales during the Exposition aggregated OVER ONE HUNDRED MACHINES, for every part of the country and for work on all kinds of stock.

We invite particular attention to our SPECIAL machines, combining in one all the features of both air and sieve Purifiers, perfectly adapted to handle and purify the breaks of roller mills.

Write for descriptive circular and price list to the

GEO. T. SMITH MIDLINGS PURIFIER CO., Jackson, Mich.

[Mention this paper when you write us.]

EUREKA MANUFACTURING CO.,

Manufacturers and Sole Proprietors of the

BECKER BRUSH

Galt's Combined Smut and Brush Machine.

The Only Practical Cone-Shaped Machines in the Market, and for that Reason the Best.

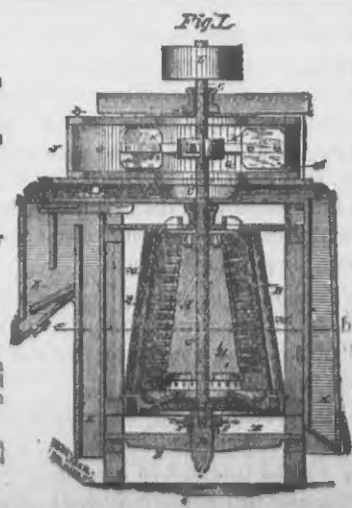
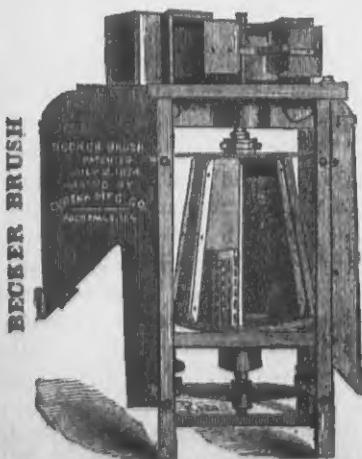
ADJUSTABLE WHILE IN MOTION.

Nearly 1,000 of these Machines in Use

In the United States and foreign countries, and so far as we know all that use them are pleased. Millers, millwrights and milling experts claim the Cone Shape Solid Cylinder Brush is the true principle to properly clean grain. All machines sent on trial, the users to be the judges of the work. For prices and terms apply to

EUREKA MANF'G CO., Rock Falls, Ill., U.S.A.

[Mention this paper when you write us.]



The Lockwood Medal, "Awarded to the Geo. T. Smith Middlings Purifier, as the machine marking greatest progress and utility in its application to the grain and milling interests, invented within the last ten years."

Millers' International Exhibition, Cincinnati, Ohio, 1880.

1865.

1881.

C. A. FOLSOM & SON,

Manufacturers of the Purest and Best

Lubricating and Burning Oils

GREASES, ETC.

For Flour Mill Machinery,

SPECIALTIES,

MILLERS' CASTOR Machinery Oil.

A compound oil, warranted better than Lard or Spermaceti for machinery uses, and will last longer. Guaranteed not to heat or gum, and to give satisfaction when used on steps, spindles, etc.

MILLERS' LAMP OIL.

Warranted free from Petroleum: Burns equal to Lard or Spermaceti. Will not chill at 32° above zero, and much cheaper than Lard Oil.

GLOBE A, Natural W. Virginia Rock Oil.

A perfectly natural oil, just as it comes from the earth. Thoroughly settled and refined of high fire test, and will not congeal at zero. It is the best Black Oil produced.

Peerless Mill Doap.

A compound Grease for use on oars and all heavy gearing. Put up in kegs, half barrels and barrels.

CAPITOL CYLINDER OIL.

Manufactured for Steam Cylinders, especially for use in Patent Lubricators. Warranted not to foam, heat or gum, and endorsed by manufacturers of Corliss Engines. We also have all grades of Spermaceti and Golden Machinery, Lard, Engine, and several grades of Cylinder and Black Oils, Plumbago, Cotton Waste, etc., etc., which we will offer at prices that defy competition, when quality is considered. Orders and correspondence solicited.

C.A. FOLSOM & SON,

130 WEST WATER STREET, MILWAUKEE, WIS.

[Mention this paper when you write us.]

The Perfect Feed Box.



It insures a perfectly even distribution of the middlings over the entire width of the cloth. Every miller will appreciate this. Fits all purifiers. Address

CASE MANUFACTURING CO.,

COLUMBUS, OHIO.

[Please mention this paper when you write us.]

Speculation and Gambling.

THE ESSENTIAL DIFFERENCE BETWEEN THEM
—AN IMPORTANT DECISION.

Judge Cole, of the Supreme Court of the State of Wisconsin, has recently made a decision which, on account of its importance, we print in full. The judgment appealed from and reversed had been given by the Milwaukee County Court, and upon the following facts: Henry Backhaus, a country merchant living in Washington county, Wisconsin, engaged in a series of wheat deals, employing as his agents Messrs. Zinkeisen, Bartlett & Co., members of the Milwaukee Chamber of Commerce. The transactions, which were in the form of short sales for future delivery, were all executed by the agents in accordance with the rules of the Milwaukee Chamber of Commerce, where the contracts were made. They resulted in a serious loss, and Backhaus settled with his factors, Messrs. Zinkeisen & Bartlett, by giving them several notes, due at different times, secured by a mortgage on real estate. Before their maturity these passed out of the hands of Zinkeisen, Bartlett & Co. into the possession of Henry C. Barnard, who had purchased them in good faith. When they became due they were not paid, and Barnard, as the last endorser, was held liable for their amount, whereupon he brought suit against Backhaus, and endeavored to foreclose on the property mortgaged by Backhaus as security for the notes. The defence was want of consideration for the notes when given, as the transactions were illegal under the statutes of the State, being in the nature of gambling contracts. The Court awarded a judgment to Barnard, on the ground that the contracts from which the debt accrued were made in good faith by the factors, and that no law was violated in the business transactions which resulted in the debt and its liquidation by the notes on which payment had been refused. The case was then appealed to the Supreme Court, and on June 23d, 1880, Chief Justice Ryan made an order reversing the decision of the County Court. On account of Justice Ryan's death before he had written an opinion, the work fell to Judge Cole, whose decision is based upon principles which may be stated as follows:

The law does not condemn speculative transactions providing the intention really is that the commodity shall be actually delivered and received when the time for delivery arrives, not even if the seller does not possess the commodity sold and has made no provision to get it in order to deliver to the purchaser, because it is purchasable in the market. But in the absence of the intention to deliver and receive the commodity, and when the intention is merely to pay and receive the difference between the price agreed upon and the market price on some future day, the contract becomes illegal gambling and therefore void.

The application of these principles to the facts in the case appears very plainly in the aftergoing complete copy of Judge Cole's decision:

There can be no doubt that a contract in writing for the sale and delivery of wheat, or on any commodity at a future day, for a stipulated price, which is made with a *bona fide* intention on the one hand of delivering the property, and on the other of receiving and paying for it, is perfectly valid. Such contracts are constantly made in legitimate transactions and are unobjectionable in law. As was observed by the learned counsel for the plaintiff, a person intending to ship wheat or intending to manufacture it into flour or who is under obligations to deliver it in other markets, may find it to his advantage to purchase in advance of the time he actually needs the grain for use. When there is an impression that the price of a commodity is likely to rise, dealers in that commodity will make these time contracts, as they are called, in order to profit by the anticipated rise. Persons may and do purchase wheat in advance because they believe there will be a rise of price in the markets of the world, in consequence of scarcity or some unusual demand; they may and do speculate in regard to future prices of this and other commodities often-times—as has been said—exhibiting in their speculations great forecast and ability, much knowledge of business affairs; and so long as their engagements are entered into with the intention that the subject matter of the contract shall be delivered and received in good faith, courts uphold their agreements.

As was remarked by Mr. Justice Agnew, in *Kirkwood vs. Bonsall*, 72 Pa. Sr. 155, "We must not confound gambling, whether it be in corporation stocks or merchandise, with what

is commonly termed speculation. Merchants speculate upon the future prices of that in which they deal, and buy and sell accordingly. In other words, they think of and weigh, that is, speculate upon, the probabilities of the coming market, and act upon this lookout into the future, in their business transactions; and in this they often exhibit high mental grasp and great knowledge of business, and of the affairs of the world. Their speculations display talent and forecast, but they act upon the conclusions, and buy or sell in a *bona fide* way." And the law does not condemn such transactions providing the intention really is, that the commodity shall be actually delivered and received when the time for delivery arrives. Consequently, as claimed by counsel, no legal objection exists to such time contracts, which are to be performed in the future by the actual delivery of the property by the vendor, and the receipt and payment of the price by the vendee, if the contract is in writing. And it is also true, as stated by him, that a contract for the sale of goods at a future day is not invalidated by the circumstance that at the time the contract is made the vendor neither has goods in his possession nor has entered into an agreement to buy them. A party may go into the market and buy the goods which he has agreed to sell and deliver. Therefore, a contract to deliver at a future day is not necessarily a wagering or gambling contract.

But when such a contract is made as a cover for gambling, without any intention to deliver and receive the grain, but merely to pay and receive the difference between the price agreed upon and the market price on some future day, then it becomes within the statute of gaming and is void in law.

Courts in the main are in accord in regard to these legal principles. If any diversity of views is found to exist, it is rather in the application of the law to the particular facts, than as to the law itself. Wagering contracts are generally—almost universally—condemned on some ground, either as being a violation of a positive statute, or void as against sound public policy. Whenever the elements of a wagering contract are found to enter into a transaction it is condemned as illegal. But it is the manifest duty of courts to scrutinize closely these time contracts, and determine whether they were really intended by the parties to be what their language imports, real contracts for the future sale and delivery of grain; or whether in fact, they were mere bets or wagers on its price at some future day.

It will not do to attach too much weight or importance to the mere form of the instrument, for it is quite certain that parties will be astute in concealing their intention and the real nature of the transaction, if it be illegal. It may safely be assumed that parties will make such contracts valid in form, but courts must not be deceived by what appears on the face of the agreement. It is often necessary to go behind or outside the words of the contract; to look into the facts and circumstances which attend the making of it, in order to ascertain whether it was intended as a *bona fide* purchase and sale of property, or was only colorable. And to justify a court in upholding such an agreement it is not too much to require a party claiming rights under it to make it appear that the contract was made with an actual view to the receipt and delivery of grain, not as an evasion of the statute against gaming, or as a cover for a gambling transaction. Especially should this be the rule in this State, where there is a statute which expressly declares that "all wagers, bets or stakes, made to depend upon any gaming by lot or chance, or upon any bet, chance, casualty, or unknown or contingent event whatever shall be unlawful; all contracts for or on account of any money, or property or thing, in action so wagered, bet or staked, shall be void." Also there is the further provision which enacts that all premises, notes, bonds, or other contracts, mortgages or other securities, when the whole or any part of the consideration of such promise, note, conveyance or security shall be for money or other valuable thing, whatsoever, won or lost on any game or wager, or for the repayment of money lent or advanced at the time of any game, bet or wager, for the purpose of being betted or wagered, shall be absolutely void and of no effect.

Now it sufficiently appears from the evidence in the case, that at least some of the transactions between the parties which enter into the consideration of the note in suit were gaming transactions, directly condemned or prohibited by statutory provisions, and that the whole security is tainted by them. They were contractors to pay the difference between the

price of wheat at the time the contracts were made and the price at a subsequent time. The features or elements in these contracts render them essentially gaming transactions, which are illegal and void. It is true the County Court found that the defendant Backhaus employed the co-defendants Bartlett & Mohr, who were commission merchants in the city of Milwaukee, to buy and sell grain as his factors; that such factors were obliged to contract in their own names, and to become personally liable to pay for such wheat as they might agree to buy, and to deliver such grain as they agreed to deliver; that all such grain was bought and sold on written contracts, by which the seller had the option to deliver the grain specified therein on a subsequent month named, and such delivery the purchaser was to pay the specified price; that at the time these various contracts were made there was no understanding or agreement that the delivery of the grain or the payment of the price should be waived or forgiven; that at the time Backhaus employed the other defendants to buy and sell grain for him, he understood that no actual wheat was to be delivered on the contracts which they should make in pursuance of his instructions, but that Bartlett & Mohr did not so understand nor did they at any time so inform Backhaus, nor did they suppose that Backhaus so intended; but they did intend to sell for him (when so instructed) actual wheat, to be delivered by themselves according to the terms of the contract which they made, such delivery to be made as the holders of such contracts might agree at the time of performance.

The weight of the testimony tends to disprove the finding of the court below, that when Bartlett & Mohr made contracts for Backhaus, they did so with a *bona fide* intention of delivering the grain, or receiving same and paying the price when the time for fulfilling the contracts arrived; yet I am not so clear on that point as I desire to be, and therefore was disposed to reverse the judgment and give the parties the further opportunity to try that question. But all my brethren think that it clearly appears that some of the transactions between the parties were gambling transactions, and the judgment should be reversed and the complaint dismissed. I have concluded to defer to their views upon the facts of the case.

Much has been said on the argument in regard to the course of business or method of dealing in grain in the Chamber of Commerce in Milwaukee, and the manner in which contracts for the sale and purchase of that article were performed or adjusted by its members. It is not necessary to go into any discussion of those matters now, nor express any further opinion than we have already as to the validity of those transactions. We merely say that we suppose contracts in writing entered into by the members of the Chamber of Commerce for the sale and delivery of grain at a future day, for a price certain, which are made with a *bona fide* intention on the one hand to deliver, and on the other to receive and pay for the grain, are valid in law. "But such a contract entered into without an intention of having any wheat pass from one party to the other, but with an understanding that at the appointed time the purchase is merely to receive or pay the difference between the contract and the market price, is another thing, and such as the law will not sustain."—*Rumsey vs. Berry*, supra. It does not matter for what form the parties give their contract, unless it appears affirmatively and satisfactorily that they were made with an actual view to the delivery and receipt of the grain, and not as an evasion of the statutes of gaming or as a cover for a gambling transaction.

It follows from these views that the judgment of the County Court must be reversed, and the cause remanded with directions to dismiss the complaint.

Our Foreign Commerce.

The last annual volume of reports on commerce and navigation issued by the Bureau of Statistics contains a chart exhibiting graphically the value of our commerce with the principal foreign countries during the last fiscal year. To those unfamiliar with such charts it may be well to describe this one, which is a rectangular slip about 20 inches by 10; from one of the upper corners red bands extend side by side toward the opposite corner, each band representing a country, and the relative length of the bands representing the relative commerce with the respective countries. The figures in tabular form accompany this, as usual, but the special value of such charts is that they exhibit to the eye at a glance, graphically, the relationship of the facts shown, just as a map exhibits the relative size and location of States. On this statistical map Great Britain, of course, stands at the top,

represented by a band extending almost across; France is next, with a band almost exactly one-fourth as long; then come the West Indies and Germany, and then the notched surface made by the ends of the bands breaks irregularly down, until the bands become little squares. Merchandise only, it should be understood, is covered in the statistics of this paragraph. Of the \$1,503,593,000 total of foreign trade—which was an increase of 118 per cent upon the trade of 1859-60, and of 81 per cent upon that of 1869-70—the United Kingdom had \$664,410,000, or 44.19 per cent; France \$169,407,000, or 11.26 per cent. Germany stands next, with 7.27 per cent; then Cuba and Porto Rico, with 5.59; then British North America, Brazil and Belgium, these three bringing down the percentage from 4.25 to 3.06. The British East Indies, China and Hong Kong, the Netherlands, Italy, Spain, Japan and Mexico bring it down to just 1 per cent; then twenty-eight other countries, and one item of lumped figures unspecified, finish the total with fractions of 1 per cent each. Our neighbor, Mexico, now the subject of much speculative interest, stands next to Russia, but to Russia we sell \$13,000,000 of domestic goods, receiving in return scarcely three-quarters of a million, while as to Mexico, imports and exports, \$15,000,000 in all, are nearly equally divided. If the proportions of each country in imports and exports separately were figured out, the order would stand very differently. The contrasts between imports and exports, as respects the different countries, is also very marked. We buy \$70,000,000 of Cuba and Porto Rico, and sell \$13,000,000; sell Brazil \$8,000,000, and buy of her \$52,000,000; sell Spain \$14,000,000, and buy \$5,000,000 of her; as to Japan, China and Hong Kong, Spanish Provinces except Cuba and Porto Rico, Venezuela, Uruguay and the Argentine Republic, our purchases are several times as great as our sales. The moral is very emphatic that there is an imperative need of more export outlets, and for more than our raw materials; more study of the wants and habits of foreign nations is requisite, and a revival of the carrying trade by which they can be reached on shorter lines of travel than now. The United Kingdom takes from us more than double her \$210,000,000 of sales to us, and France sells us \$69,000,000 and buys \$100,000,000. If these countries, whose trade amounts to 55.45 per cent of the whole, were taken from the list, our imports would stand \$387,996,000, against \$281,779,000 exports, thus turning the "balance of trade" decidedly the other way. Of the \$75,000,000 net imports of the precious metals, England sent \$32,000,000 and France \$33,000,000.—*New York Times*.

The American Railway System.

The marvelous growth of the American railroad system is again brought to mind by the early sheets of "Poor's Manual for 1881," which reveals some astounding and many curious facts. It brings down the statistics to the end of 1880.

The railroad mileage of this country on Jan. 1st, 1881, amounted to 93,671, of which 7,174 miles were constructed during the past year, as against 2,771 for the year 1879, and 2,607 miles for the year 1878.

No other single circumstance could be cited which would illustrate so pointedly the renewed activity and high prosperity of the past year. The continuation of the same conditions during the present year make it certain that the length of the railroads in this country at the end of this year will reach a round 100,000 miles.

The combined capital stock and debts of the railroad companies, representing the nominal investment and value, amount to over five billions (\$5,108,000,000), or two and a half times as much as the present national debt. As the bonds of the various roads are liens thereon, and will be paid for the most part, they may be regarded as a legitimate part of the cost, and, reckoned as a whole, they amount to over \$2,392,000,000. Of the capital stock—\$2,553,733,176—it is fair to deduct at least \$1,000,000,000 as "water," or fictitious increase over the actual investment. The real value of the railroads of the United States may, therefore, be set at about four billions (\$4,000,000,000), or double the national debt.

The earnings of the railroads during the past year were not less remarkable than their extension and progress. Their gross receipts amounted to 616 millions in 1880, as against 529 millions in 1879. This shows an increase of about 18 per cent in the business transacted, or about four or five times the rate of increase in population.

The year was especially favorable to the railroads on account of the extraordinary yield of crops and the enormous foreign demands. These conditions also enabled railroads to maintain high freights. Hence their net earnings, notwithstanding their large expenditures for extensions of track, and renewals and additions for rolling-stock and facilities, ran up to \$255,193,438 from \$219,916,724 in 1879,—an increase of over \$35,000,000. The dividends on stock were \$77,115,411, against \$61,819,470 in the previous year. These facts will account for the tremendous "boom" in railroad stocks, which, having gone too high, are now giving way under the prospect of decreased earnings during the current year.—*Chicago Tribune*.

Francis Roberts, of Glasgow, Kansas, is building a four-run new process mill, using machinery made by Nurdyke & Marmon Co., of Indianapolis, Ind.

A Milling Reminiscence.

[Written for the United States Miller by John W. Hinton.]

BURNED.—June 17, Samuel Keeley's flouring mill at Cambria, Wis. Loss, \$12,000. Insurance, \$7,300. The mill had a capacity of 125 barrels per day, and was run by both steam and water power. It will probably be rebuilt this season.

The above is from your last issue. As reminiscences are in order, the relation of one pertaining to the first mill built at Cambria, Columbia county (then called Belleville, Portage county), may be interesting to your readers. The original proprietors of the first mill (a saw mill) were Samuel Langdon and Jonas Warncke. The "raising of that saw mill" was quite an event, and men came from a circuit of ten miles to attend it. Surrounding the site of the mill was a patch of white oak, short and tough, with here and there a hackberry tree. The posts of the mill were hewn out of this timber, and were sixteen inches square, with beams to correspond. The "bent" overhanging the creek behind the dam was very heavy, and could only be raised outwardly; should it fall it would descend from thirty to forty feet, and the raising was attended with much danger, particularly to the two who held the handspikes in the mortices to keep the feet of the posts from sliding outwardly, and to let them drop into the mortices when the "bent" was nearly plumb. Many of those who helped at that raising—thirty-five years ago—sleep beneath the sward on the edge of Portage Prairie, rest in the cemetery at Cambria, or lost their lives on Southern battle fields. A prominent member of the Chamber of Commerce of Milwaukee, Mr. George Knowles, as also his brother James, were there tugging, pulling, and joining in the chorus of "yo heave ho," as a tackle was used to raise the heavy bents.

Langdon, one of the first owners, is reported as dead. Of Jonas Warncke "thereby hangs a tale." By trade he was a cabinet maker and a most excellent workman. The first "pitman" to the mill was made out of a cherry tree, which had grown on the edge of the creek. Warncke cut it down, hewed out the pitman in rough, and when it was planed and sandpapered and greased it shone as it rose and fell driving the saw through the oak logs, the lumber of which sold at \$8 a thousand.

Up to the time of the completion of the mill, Warncke had been one of the steadiest and most thoroughly industrious men there. An unfortunate marriage set him to drinking; he became dissipated, and, while stopping at a tavern, near Markesan, and as was afterwards shown, was stupidly drunk, he was inveigled into assisting at the robbery of a German family, living near there, reputed to have a large amount of gold coin in the house. Warncke went with the tavern keeper, his brother, and another man, and staid in the wagon while the three went into the house to commit the robbery, which created the wildest excitement at the time.

The parties went up stairs, and, clutching the old people in their bed, demanded their money. The old German woman passed the robbers a stocking filled with old-fashioned buttons, when they at once started to leave. One of the sons had heard the men enter, and hid himself till they had got up stairs, when he drew on his pantaloons, and, grabbing a loaded double-barrelled shot-gun, which hung on some pegs, went out and squatted in the bushes by the side of the path which led to the road, and, as the robbers were leaving, he fired at them, first one, then the other barrel. Cries and groans were heard. The wounded man was dragged off by his companions, the bushes were sprinkled with blood and a trail of it found the next morning leading to the road. It was claimed afterwards that the wounded man had died immediately and was disembowelled by his comrades, and weights tied to the body which was sunk in Lake Maria near by.

Warncke, with returning sobriety, told all and gave himself up; the other two were arrested, tried and convicted, principally upon the admissions of Warncke. All were sent to Waupun, Warncke for a short term. Before it had expired, Governor Lewis pardoned him out. Judge, jury, District Attorney, Sheriff, and a very large number urged the pardon, for never was more contrition and sorrow shown than was by Warncke. And now comes one of the strangest of facts. The writer hereof, who knew Warncke well, and was under some obligation to him, helped make the dam at Cambria and worked for the owners of the mill, aided in procuring the pardon. Before it was granted some friends subscribed thirty dollars to purchase an outfit of suitable clothing for Warncke, and Mr. A. D. Seaman, of Milwaukee, long since dead, to his honor be it said, not only gave a little money, but at

once promised, when application was made to him, to give Warncke a place at good wages in his furniture manufactory. The money was taken to Waupun, left with a gentleman who was to give it to Warncke as soon as he left the prison, with a pass for him to Milwaukee given by the railroad the moment the facts were laid before them. Warncke was seen and he agreed to come in.

Learning of his release, the writer went to Waupun, saw Warncke on the street who avoided him, found the money had not been called for; sent a note to Warncke at his boarding-house, got no reply. The money was paid back to the subscribers. The next heard of Warncke he was suspected of aiding in the murder of a man named Williams, who had been innocently convicted in Milwaukee, and committed to Waupun, and who had \$300 which was paid him at the expiration of his term. He was murdered and robbed near Lake Emily, his body dressed in a suit of clothes stolen from a house near at hand, was dragged into a thicket near Schaumburgh's by the lake, where it was found after decomposition had set in.

Warncke was never caught. He was traced by the Sheriff of Dodge County to near the southern lines. It was after the rebellion broke out. It was supposed he had joined the Confederates. He has never been heard of since. The saw mill, I believe, still stands there.

Funnygrafs.

A WELSH rector being on a visit to a neighboring squire, when a very small glass was set before him after dinner, he pulled the servant by the skirts, and thus expostulated with him: "What is this glass for? Does your master wish to keep me here all night?"

"Do you know who I am, sir, that you dare talk so to me?" said an irate father to an impudent young hopeful. "Yes, I know who you are," was the reply; "but Mr. Brown, who lives next door, don't; for I heard him say only to-day that you were an old ass."

"HOW CAME such a greasy mess in the oven?" said a fidgety old spinster to her maid-of-all-work. "Why," replied the girl, "the candles fell into the water, and I put them into the oven to dry."

"YOU SEEM to enjoy telling fibs," drily remarked an old lady to her little niece the other day. "Yes, auntie," replied the awful child, "I think I do; but I enjoy seeing you swallow them more."

"CAN you steer the main-mast down the fore-castle stairs?" said a sea-captain to a new hand. "Yes, sir, I can, if you will stand below and coil it up." The captain didn't catechise that man any more.

Vibration in Mills.

The *Iron Age* contains some very sensible and valuable suggestions in regard to vibration in high mills. Though it takes for its text the textile mills of New England, its remarks are applicable as well to flour mills, though it would hardly be possible to construct a large flour mill with only two stories, which is the remedy proposed by our contemporary, whose remarks we abridge: "In many New England mills the vibration will, in the loftiest structures, cause water to slop over from a pail two-thirds full, if the pail be placed on one of the highest floors. Gas pendants show corresponding vibration (plainest when loosely hinged) by swaying two or three inches. Such tremor, though in less degree, has been noticed in heavily built four-story stone mills, and even in those having iron doors with brick arches. This jarring is not only hard on shafting and hangers, but especially detrimental to cog-wheels and all delicately set machinery. It is in accordance with natural laws, just as iron constantly jarred becomes more granular in form and weaker in cohesive force, that walls of brick or stone subject to constant tremor shall become disintegrated and weakened. In such a case the work of the fire is partly done before ignition commences.

The buildings may not fall before a fire, as in the case of the large Pemberton mills some years ago, but when fire attacks a factory whose walls have for years been shaking, as with a chronic chill, the whole building is likely to fall into one mass of ruin early in the fire, or else the fire be much more extended by the falling of the long-shaken walls, than if they had been able to resist the suddenly added molecular vibrations of intense heat. There is undoubtedly a difficulty in strengthening wooden girders with iron rods and trusses, for in case of fire such compound girders are weaker than one of wood only, because, trusting to the iron, they are frequently overloaded; and it is during strong

heat that the weakness of iron becomes apparent. Rectangular iron knees to brace girders to walls are objectionable, because in a fire, when the interior pillars yield, the ends of girders in the wall may so hold that the leverage of the timber will pull the wall inward. It should be remembered that by the intense heat of a fire heavy walls are temporarily weakened, but if strong enough to stand their strength returns after cooling, and they can often be used in case of rebuilding or restoring.

It is a fact that in mills of ordinary construction a safe form for stability and for low rate of fire destructibility, is two stories high, extending over sufficient space to give the room required. It is safe to assume that equal cubic content, with double the base area, has but one-half the fire loss liability or the double altitude, with conditions otherwise equal. Add to the fire results of difference in height the effect of the greater vibration of the higher structure, and the hazard of the higher structure is yet further augmented. A one-story mill with cement floor—and especially if all the roof be iron—is the safest fire risk any manufactory can offer; but next to it comes the two-story mill, which, for many kinds of work, is far more convenient and easier to operate than the other, while always as much cheaper as a floor is cheaper than a roof; and in a city but half the amount of costly ground would be needed. If such a two-story mill had, at proper intervals, strong dividing brick walls, extending several feet through the roof, and iron doors for communication, sliding into the wall, not only would such division wall brace the building so as to prevent vibration, but it is probable that in the case of fire only one compartment, and perhaps only one story of that compartment, would be seriously injured.

Setting Wheels Above Tail Water.

The Stilwell & Bierce Mfg. Co., give the following practical hints in regard to setting wheels above tail water: "Sometimes in adapting wheels to very high heads, to avoid excessive length of shaft on wheel, and to otherwise conform the peculiar location, it becomes necessary to set the wheel some distance above tail water, and conduct the water away from the wheel through a draft tube. The same depth of pit and area of discharge are required where a draft-tube is used, as would be were the wheel at the bottom of the fall. Theoretically, draft-tubes may be used of any length up to thirty-three feet, but practically we find it inadvisable to use draft-tubes exceeding twenty feet in length, because of the difficulty in making and keeping them air-tight; and if the draft-tube leaks air at all, the vacuum is imperfect, and the loss of power, due to the loss of heat, is the result. Draft-tubes, if used, must be of sufficient internal diameter to receive the cylinder of wheel-case. If constructed of wood, it should pass up through the opening made in the floor of penstock, flush with the face of the cants upon which the wheel-case rests, and be firmly secured to the penstock by spikes or screws, and be securely banded at frequent intervals with iron hoops. If constructed of iron, which is far preferable to wood, the ring or flange to which the tube is riveted should be faced off true, and let into the cants, so as to form a perfect joint with the flange of wheel-case. As a rule, on all falls of moderate height, we would advise that the wheel be set at the bottom of the fall. But in all cases where a draft-tube is used, we would recommend having one made of boiler-iron, so as to secure durability and perfect tightness."

A slight idea of the business transacted by Edw. P. Allis & Co. can be had by learning as we have that they received orders from March 1st, 1881, to June 20, 1881, for thirty-two complete steam engines. Of course, engine-building constitutes only a fraction of the amount of labor performed there.

BOOK DEPARTMENT.

For the convenience of our readers, we have made arrangements with publishers so that we can furnish any of the following works, postpaid, on receipt of price. All remittances must be made by post-office money order, draft on New York or Chicago, or by registered letter. For sums of less than \$1 postage stamps will be taken. Address all orders to

E. HARRISON CAWKER,
Publisher United States Miller,
Milwaukee, Wis.

CRAIK.—The Practical American Millwright and Miller. By DAVID CRAIK, Millwright. Illustrated by numerous wood engravings, and two folding plates. 8vo. 25.
CONTENTS.—Part I. Introduction.—Chapter I. Mechanical Power, The Lever, The Inclined Plane, The

Wedge, The Screw, The Pulley and Cord, The Crank, II. Fly and Balance Wheels, Centrifugal Force and Circular Motion, Action and Reaction, Friction. III. Transmission and Transportation of Motive Power. IV. Peculiarities and Properties of Pressure of Water, Tearing Levels, Fitting Down Sills Under Water, Pressure of Water, Velocity of Falling Water, Tables of Velocity of Water and Quantity Discharged, Measuring a Stream of Water, Table of the Quantity of Water Passing Over a Weir. Part II. Water Wheels. V. The Undershot. VI. The Overshot. VII. Experiments with Wheels, Barker's Wheel. VIII. Central Discharge Wheels. IX. Spiral Discharge Wheels, The Ross Wheel. X. Spiral Screw or Flood Wheels. XI. Mill-Dams. Part III.—Saw Mills. XII. The English Gate. XIII. The Mulley Saw. XIV. The Gang. XV. The Circular Saw-Mill, The Edging Circular, Table of Loss Reduced to Inch-board Measure. Part IV. Grist Mills. XVI. Planning, Gearing, Belt Gearing, Gearing Overshot, The Building, The Hask Timbers, etc., The Bridge Trees, The Step, The Spindle, The Bed-Stone, The Driver, The Damel, The Boxes, Burr Stones, The Curb, The Hopper, Shoes, Mill Stones, Burr Stones, Truing the Stones, Draught, Dressing the Stones, The Quarter Dress, The Sickle Dress, Balancing the Runner, Bolts, Bolt Chests, Bolt Cloth, Smut Machines, Screens, Merchant or Manufacturing Bolts. Part V.—XVII. The Oatmeal Mill, The Kiln, The Process of Drying, Dressing, and Hanging the Stones, Manufacture of Split Peas. XVIII. The Barley Mill. XIX. Wool Carding and Cloth Fulling and Dressing, The Tenter Bars, The Shearing Machine, The Cloth Press. XX. Windmills. XXI. Steam Power. Index.

HUGHES.—American Miller and Millwright's Assistant. By WM. CARTER HUGHES. A new edition. In one volume, 12mo. \$1.50.

Among the Contents will be found the following: Introduction—Explanation of Technical Words. Part I. On the First Principles of Mechanics.—Table of the Surfaces of Solids without Unguents.—Tables of the Results of Experiments on Friction, with Unguents, by M. Morin.—Table of Diameters of First Movers.—Table of Diameters and Circumferences of Circles, Areas, and Side of Equal Squares.—Geometrical Definitions of the Circle and its Parts.—Centre of Percussion and Oscillation. Hydrostatics: Introduction.—On the Upward and Downward Pressure of Water.—Specific Gravity.—Table of Specific Gravities.—Hydrodynamic Power of Water-wheels.—On the Action and Reaction of Water, as applied to Water-wheels.—On the Construction of the Combination Reaction Water-wheel.—Table of Velocities of Water-wheels per minute, with Heads of from four to thirty feet.—Table of the Number of Inches of Water Necessary to Drive one Run of Stone for Grist or Saw-mills on Heads of four to thirty feet.—Table showing the Required Length of Overshot and Breast-wheels on Heads of ten to thirty feet.—Table showing the Velocity of Water. Part II.—Practical Milling and Millwrighting.

PALLET.—The Miller's, Millwright's and Engineer's Guide. By HENRY PALLET. Illustrated. In one vol. 12mo., \$3.

LEFFEL.—The Construction of Mill-Dams: Comprising also the building of Race and Reservoir Embankments and Head Gates, the measurement of streams, gauging of water supply, etc. By JAMES LEFFEL & Co. Price, 50 cents.

LARDNER.—The Steam Engine: For the use of Beginners. By DR. LARDNER. Illustrated. 12mo, 75 cents.

TEMPLETON.—The Practical Examiner on Steam and the Steam Engine: With Instructive References relative thereto, arranged for the use of Engineers, Students, and others. By WM. TEMPLETON, Engineer. 12mo, \$1.25.

BOURNE.—Recent Improvements in the Steam Engine: In its various applications to Mines, Mills, Steam Navigation, Railways, and Agriculture. Being a supplement to the "Catechism of the Steam Engine." By JOHN BOURNE, C. E. New Edition. With numerous Illustrations. 16mo. Cloth, \$1.50.

BYRNE.—Handbook for the Artisan, Mechanic and Engineer: Comprising the Grinding and Sharpening of Cutting Tools, Abrasive Processes, Lapidary Work, Gem and Glass Engraving, Varnishing and Lacquering, Apparatus, Materials and Processes for Grinding and Polishing, etc. By OLIVER BYRNE. Illustrated by 185 wood engravings. One vol. 8vo., \$5.

EDWARDS.—A Catechism of the Marine Steam Engine, For the use of Engineers, Firemen and Mechanics. A Practical Work for Practical Men. By EMORY EDWARDS, Mechanical Engineer. Illustrated by 60 engravings, including examples of the most modern Engines. In one volume, 12mo, \$2.

WATSON.—The Modern Practice of American Machinists and Engineers: Including the Construction, Application and Use of Drills, Lathe Tools, Cutters for Boring Cylinders and Hollow Work Generally, with the most Economical Speed for the same; the Results Verified by Actual Practice at the Lathe, the Vice, and on the Floor, together with Workshop Management, Economy of Manufacture, the Steam Engine, Boilers, Gears, Bolting, etc., etc. By EUGENE F. WATSON, late of the "Scientific American." Illustrated by 86 engravings. In one volume, 12mo, \$2.50.

LUKIN.—The Young Mechanic. Practical carpentry, containing directions for the use of all kinds of tools, and for construction of steam engines and mechanical models, including the art of turning in wood and metal. By JOHN LUKIN, author of "The Lathe and Its Uses," etc. Illustrated. 12mo, \$1.75.

LUKIN.—Amongst Machines: Embracing descriptions of the various mechanical appliances used in the manufacture of wood, metal, and other substances. 12mo, \$1.75.

LUKIN.—The Boy Engineers: What They Did, and How They Did It. With 30 plates. 12mo, \$1.75.

WILSON.—A Treatise on Steam Boilers: Their Strength, Construction and Economical Working. By ROBERT WILSON. Illustrated. 12mo, \$2.50.

CONTENTS.—Chapter I. Introductory. II. Strength of Cylinder, Sphere and Flat Surfaces. III. Properties and Character of Boiler Materials. IV. Riveting. V. Welding. VI. Construction of Boilers. VII. Boiler Mountings and Setting. VIII. Incrustation. IX. Wear and Tear. X. Factor of Safety. XI. Testing. XII. Boiler Explosions. XIII. Combustion of Coal. XIV. Smoke Prevention and Firing. XV. Heating Surface. XVI. Boiler Power. XVII. Bursting and Collapsing Pressures of Cylinders.

NYSTROM.—A New Treatise on Elements of Mechanics: Establishing Strict Precision in the Measuring of Dynamical Terms: accompanied with an Appendix on Duodenal Arithmetic and Metrology. By JOHN W. NYSTROM, C. E. Illustrated, 8vo, \$4.

MOLESWORTH.—Pocket-Book of Useful Formulae and Memoranda for Civil and Mechanical Engineers. By GUILFORD L. MOLESWORTH, Member of the Institution of Civil Engineers, Chief Resident Engineer of the Ceylon Railway. Second American, from the Tenth London Edition. In one volume, full-bound in pocket-book form, \$2.

ROPP'S COMMERCIAL CALCULATOR: Containing many convenient and valuable Tables, showing the value of Wheat, Corn, Rye, Oats, Barley, Cattle, Hogs, Hay, Coal, Lumber, Merchandise; the simple and compound interest at 6, 7, 8 and 10 per cent.; Measurement of Boards, Scantlings, Timber, Saw Logs, Cisterns, Tanks, Granaries, Corn-Cills, Waggon-Beds, Time Table, Wages Table, etc., etc. Also entirely new and Practical Method of Rapid Calculation. By ORRINIAN ROPP, Jr. Pocket-book form, cloth, \$1.

McLEAN.—The Miller's Test-Book. By JAMES McLEAN, of Glasgow, Scotland. Price, postpaid, 60 cents.

Any other books, either domestic or foreign, that our readers may desire, we shall be pleased to obtain and furnish to them at the lowest rates, postpaid, to any part of the United States or Canada.

Trial of American Seed-Wheat in Japan.

REPORT BY CONSUL J. STAHLE, OF HIOGO.

I have the honor to report the result of a trial cultivation of American wheat in this district, and the causes that necessitate the introduction of foreign seed.

Next to rice, perhaps the most important farming product of this district is wheat, and, since the export of grain has been permitted, considerable quantities have been sent away from this port to China and elsewhere. There is no doubt, however, that it would become a much more important article of export were an improvement made in its mode of cultivation. In the first place, the fields are laid down in ridges of a little more than one foot in width, on which are sown two rows of wheat so thickly that the plants have not room to develop themselves. This causes very uneven growth, the outer plants coming to maturity long before those which have a bare struggle for life in the middle of the rows. The result is that the crop ripens irregularly, the ears on the inner plants being quite green, while those on the plants more favorably situated are ready for the sickle.

As this system has been going on for generations, it is not to be wondered at that the quality of grain has very much deteriorated, and the Japanese wheat instead of being, as it ought to be, equal to any in the world, is about the worst.

The first thing necessary to improve the quality of Japanese wheat is to introduce fresh seed. But this will be of no lasting benefit unless the system of cultivation is entirely changed. The climate of Japan is well adapted to the growth of wheat; the farmers are industrious, and, with an improved method of cultivation, there is no reason why Japan should not take her place as one of the wheat-producing countries.

The Governor of this Ken, who is aware of the fact that Japanese wheat is not what it should be, is making now an effort to introduce American seed, and with this view has made, and is making, trials with American seed.

In one of the reports of the Agricultural Bureau of this Ken (department) I find a statement of M. Iwomura Zenroku on a trial cultivation of American wheat in this district. Five kinds of wheat were sown. Fifteen tsubo (tsubo, a land measure equal to 36 square feet) of red wheat on pure soil produced 9 sho and 3 go. (Sho is a measure for grain of 5 1/2 inches square by 3 1/2 inches deep, and a go is one-tenth part of a sho.) Ten tsubo of white wheat on a gravelly soil produced 5 sho and 6 go. Seven and a half tsubo of sord wheat on pure soil produced 4 sho and 9 go. Fifteen tsubo of Oregon wheat on a gravelly soil produced 12 sho and 2 go. Seven and a half tsubo of brown wheat on a gravelly soil produced 5 sho and 8 go. The red wheat was sown on the 3d of November, the others on the 28th of October, and it was all reaped on the 18th of June.

Millers and the Law on Water Courses.

Very curious and interesting disputes are constantly coming before the courts, relative to the rights of millers and manufacturers on the streams which afford them power. Any one who has taken pains to note the tenor of the decisions in these cases, will see that they conform to certain decisions in law, with which every mill-owner would do well to be conversant.

The word "riparian" from the Latin *ripa*—meaning the bank of a river—is a term used in law to refer to the rights and privileges of persons who own lands lying upon or bounded by streams or rivers. It is fixed in law and confirmed by court decisions, that every riparian proprietor has an equal right to a free use of the water which passes his land. He has, however, no exclusive property in the water itself, but the simple use of it as it passes. He cannot appropriate it to his exclusive use nor divert it permanently from its natural channel without the consent of the adjoining proprietors. If he does not divert it on his own premises, he must return it to its ordinary course when it leaves his estate.

These are the broad principles upon which the general and State laws are based. Of course, the minor details of water rights, etc., are subject to local State enactments, forms and restrictions, otherwise streams of running water could rarely be properly applied to agricultural or manufacturing purposes. In all instances it may be taken for granted that nothing but positive surrender of rights or contract to the contrary, can deprive the riparian proprietor of the use of the stream passing him until he has had use of it, if he wishes to employ it legitimately.

If the water is insufficient for the mill-owner's purposes, but can be made, by a reasonable detention, available for power, the courts have decided that he can so retain it until he has enough to use profitably. The mill-owners further down must do the best they can, being, of course, entitled to their share of the water when it gets to them in regular course. Again, as to protecting himself from damage by freshet or overflow, he can erect such protection as may be necessary in the way of embankments, etc., even though such protective measures may back the water upon the adjoining land. The land-owner in the latter case has no legal cause for action.

Of course, no mill-owner would be justified in the malicious detention or wastage of water, or in the unwarrantable release of water so as to destroy neighboring property. He has, however, the inalienable rights of proper use of the water and of protecting himself from its ravages, let others do what they will.

In this connection, though not directly in the line of the foregoing is an interesting decision rendered in the Supreme Court of New York. The defendant had on his land a spring surrounded by an embankment. The plaintiff had a well which was dependent upon the defendant's spring for supply. The defendant cut through the embankment, thereby lowering the water in the well of the plaintiff. The court held that the plaintiff had no cause for action, no matter what was the defendant's motive. The laws and courts throughout seem to decide that the elements air and water are the untrammelled property, for the time being, of those brought into natural contact with them.—From *Leffel's recent work on Mill-dams*.

The large export trade in American flaxseed which has set in within the past few weeks is worthy of attention, since it is an excellent illustration of the changing conditions of our foreign trade. In 1875 there were imported into the United States 3,788,344 bushels of linseed, principally from Calcutta. The imports of such seed reached their height that year, and have since been steadily diminishing, owing to the increased cultivation of American seed, and the consequent enhancement of the quantity of oil made therefrom. In 1880 the imports of Calcutta linseed had fallen to 1,464,195 bushels, and at the present time only about 40,000 bushels are reported as being in transit for America, against average monthly deliveries of 300,000 bushels a few years ago. Having thus got possession of the greater part of the domestic markets, the producers of American flaxseed are now turning their attention to securing a foreign demand for their product, and have sold nearly, if not quite, 1,000,000 bushels of seed for shipment to Europe within the past few weeks.

No matter how truthful a man may be through life, he is bound to lie at the point of death.

STEVENS' ROLLER MILLS.

There is no system of milling producing such good results as those effected by the Stevens Rolls. They granulate without cutting, therefore making broader bran without rasping the impurities—consequently purer middlings, all of which are much easier to purify.

No cut bran and middlings adhering together as is the case in results produced by other than non-cutting rolls. They remove cookie shell without cutting—it passing off with the bran. They remove every germ without cutting or washing.

The frame and adjustments as now made are the most simple and effective in the world.

The most inexperienced can set them absolutely correct, because the gauge and indicator tells their own story. This fact alone is of the greatest importance to the proprietor.

With it in his mill he is not so entirely dependent on the judgment of his miller who may be inexperienced, or possibly careless, which inefficiency or neglect may daily cost a great deal of money. Have now got the best belt movement out, and can furnish either the belt or gear machine.

Millers come and see for yourselves. Can take you through any number of mills that are free for your examination from cellar to garret.

I also keep on hand a full supply of staple mill-furnishing goods. Bolting cloths made up in best manner on short notice. Plans and specifications furnished.

Address or call upon

E. W. PRIDE, Neenah, Wis.

Representing Jno. T. Noye & Sons, Buffalo.

(Please mention this paper when you write us.)

SEND FOR PRICE LIST.

RUBBER

Boots, Shoes, Coats, Cloaks, Gloves, Combs, Balls, Dolls, Bands, Hats, Penholders, Inkstands, Door Mats, Door Springs, Toilet Sets, Horse Covers, Wagon Covers, Plant Sprays, Umbrellas, Toilet Sets, Belting, Packing, Hose, Mirrors, Shooting Diapers, Syringes, Tubing, Brushed, Jewels, and everything else made of Rubber

Table and Carriage Oil Cloths, Leather Belting and Lacing

Cape Ann Oil Clothing

AT NEW YORK PRICES.

GOODYEAR RUBBER CO.,

JAS. SUYDAM, Agent,

372 and 374 East Water St., MILWAUKEE, WIS.

The only store in Wisconsin or Minnesota connected with Goodyear Rubber Co., New York.

Mr. John Glenn's new roller mill in Glasgow, Scotland, will be ready to start within a week or two. This will be the first fall American roller mill built over the water. It was designed and built completely by Ewd. P. Allis & Co., Milwaukee, Wis. The Gray patent noiseless roller machines are used in the mill, to the entire exclusion of the millstones. Mr. Glenn visited this country about a year ago and made a careful study of all the principal mills here, and settled down on the Allis machines and system, and placed his entire order with them.

A LAND MARK.

Messrs. Barrett & Son, Spring Valley, Ohio, say: During the revolutions that have been taking place in the Milling business in the last seven years, we have thrown away thousands of dollars worth of what, at the time we got it, was considered first-class machinery, including our Buhrs, in which we took so much pride. In fact, the only thing we have remaining as a LAND MARK of what we considered a splendid Mill, is the SLATER REELS; these we intend to keep.

F. Fishinger, Columbus, Ohio, in ordering a new Chest of SLATER'S REELS to double the capacity of his mill, says: When we get done, everything will be new except your Reels. They will do to keep. No man has anything that can displace them. This, after using the Reel about seven years.

For further particulars, address

C. B. SLATER & CO.,

Mill Builders and Furnishers,
Blanchester, Ohio.

MAX. HAUSER,

(Brother of Adolph Hauser, the Jeweler.)



PRACTICAL OPTICIAN (Lately from Vienna),

469 EAST WATER ST., MILWAUKEE, WIS.

Keeps a large stock of Spectacles, Eye, Opera and Marine Glasses, Microscopes, Telescopes, Barometers, Thermometers, and pays special care to a scientific adjustment of all kinds of glasses to the eye. Any of the above articles made to order and repaired.

Blanks, by means of which parties residing in the interior of the State may order spectacles as suitable as if they had personally selected them, will be mailed free on application.

Millers in need of magnifying glasses for any purpose can have their wants supplied at a reasonable price. Address as above.

(Mention this paper when you write us.)

SUBSCRIBE FOR THE

United States Miller!

THE LEADING MILLING JOURNAL OF AMERICA.

Subscription Price One Dollar per year, post paid. Address

UNITED STATES MILLER,

62 Grand Opera House, Milwaukee, Wis.

First-Class Milling Property For Sale.

Situated 1 1/2 miles from Lamolite on P. M. & St. Paul R. R., and 1 1/2 miles from Mississippi River Boat Landing, in good wheat growing section, Winona County, Minn. Mill building is 44x86 feet, 8 stories high, is of stone structure, with rock foundation. Water power, 28 feet head, never failing. Four run of French Buhrs, 2 sets of Rolls, Purifiers and Wheat Cleaning Machinery, all in good running order and making New Process flour. Cooper shop in connection with mill, also about 300 acres choice land, 120 acres under cultivation, balance timber; 2 dwelling houses, store that rents, barns, outbuildings, etc.; also 3 lumber wagons, 1 buggy, 4 mules, 1 horse, farm machinery, etc.; will be sold if desired. For information of price, terms, etc. apply to

W. DAVID & CO.,

Pickwick, Minn.

IMPORTANT NOTICE TO MILLERS.—The Richmond Mill Works and Richmond Mill Furnishing Works are wholly removed to Indianapolis, Ind., with all the former patterns, tools, and machinery, and those of the firm who formerly built up and established the reputation of this house; therefore, to save delay or miscarriage, all letters intended for this concern should be addressed with care to Nordyke & Marnon Co., Indianapolis, Ind. (Mention this paper when you write us.)

MILL FOR SALE.

Enon Valley Mills, with 3 run of stone in good running order on the Pittsburg & Fort Wayne R. R. Shipping facilities good. Address

MILLER & MARSHALL,

Enon Valley Lawrence Co., Pa.

Wanted To Rent.

A two-run or three-run Custom Mill, water power preferred, in Wisconsin or Minnesota; with privilege, of buying. Address

E. M. V. Colby, Marathon County, Wis.

FOR SALE.

A good water power and mill with two run of stone at Stone Bank, Waukesha County, Wis. Mill is doing a good business, which with a moderate amount of improvements could be largely increased. One half or the whole will be sold to the right party. For full particulars address

U. S. MILLER, Milwaukee, Wis.

Mill For Sale on Easy Terms.

A steam grist mill, with four run of buhrs, separator, smutter, purifier and bran duster—all latest improved machinery. It is in a good wheat growing country. For particular apply to the owners,

LANDIS & HOLLINGER,

Sterling, Kansas.

MILL FOR SALE.

This mill is new and in good repair, situated on the Big Blue River, 6 miles north of Beatrice, Neb.; is a three-story frame building, 26x36 feet; 4 run of stone; 66-inch Improved Turbine Water Wheel. This mill must be sold within the next 90 days. Enquire of

JOHN ROBERTSON, Assaigee, Beatrice, Neb.

FOR SALE CHEAP.

A four-run Custom and Merchant Flouring Mill; all in good repair. Good water power, 12 1/2 feet head. This mill has a first-class reputation for doing all kinds of work. It is located in a good wheat growing section. This property positively must be sold. For further particulars call on or address

HOLT BROTHERS,

North Lake, Waukesha Co., Wis.

FOR SALE.

A Flouring Mill of the latest improved gradual reduction roller system, together with 80 acres of good land, good house and barn, located on the Iowa River, 8 miles northeast of Cresco, at Kendallville. The property must be sold, and a great bargain will be given. Death of my husband, S. S. Kendall, is the reason for offering the above property for sale. For further particulars address

MRS. S. S. KENDALL, Administratrix,

Kendallville P. O., Winnebago Co., Iowa.

FOR SALE.

We, the undersigned, offer for sale on most favorable terms our Custom Flouring and Oat Meal Mills, located at Geneva, Walworth County, Wisconsin, together with an unfailing water power from Geneva Lake. All said mills are now in full repair and good working order. Said water power is in complete order and is at all times easily managed and controlled. These mills have a large custom work. The reason for this sale is the ill health of a proprietor.

GILBERT & BARBER, Proprietors,

Geneva, Walworth County, Wisconsin.

WANTED.

50 First-Class Millwrights

A number of them capable of superintending the erection of complete mill jobs.

Address

SIMPSON & GAULT,

CINCINNATI, OHIO.

Mill For Sale—A Rare Bargain.

Desiring to turn my full attention to other business I offer for sale my Mill Property in Ripon, Wis. The mill is 40x60 and four stories high with additions 44x44 and 20x40, and cooper shop. Power: 30 feet head, 3 13-inch turbines, also 75 horse power engine with two boilers. Has 2 wheat stones, one middlings and a feed run, 2 purifiers, flour packer, separator, smutter, corn sheller, etc. Handsome dwelling house can be had with the mill. It has all conveniences and modern improvements. Good schools and college in the city. Any one desiring to go into the milling business, should not fail to examine this property. When you write me please mention the *United States Miller*. Address

H. B. BATEMAN, Ripon, Wis.

BOTTLED BEER.

VOECHTING, SHAPE & CO.,

SOLE BOTTLERS OF

Joseph Schlitz Brewing Company's Celebrated Milwaukee Lager Beer

Cor. Second and Calena Streets,

MILWAUKEE

WISCONSIN.

BOTTLE SUPPLIES CONSTANTLY ON HAND

Parties corresponding will please state where they saw this advertisement.

my15

HENRY SMITH, JR.

GEO. G. SMITH.

P. A. SMITH

SMITH BROTHERS,
Practical Millwrights.

Plans, Specifications and Estimates made for all kinds of

MILLWORK, MACHINERY, Etc., Etc.

Flour, Sawmill, Tanners' and Brewers' Machinery, and General Mill Furnishers.

No. 454 Canal Street,

MILWAUKEE WIS.

(Mention this paper when you write us.)

Electric Purifier Co.,

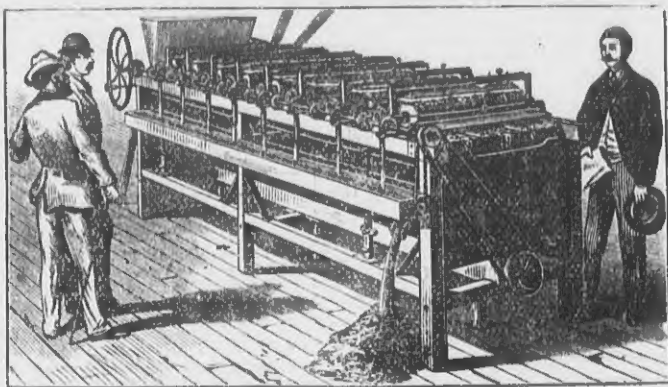
— OF —
New Haven, Conn.

Factory, New Haven.

New York Office, 17 Moore Street.

This Company was organized in New Haven on the first of March, 1881, with a Capital of \$300,000, to manufacture and sell

Electric Middlings Purifiers.



Having purchased the SMITH-OSBORNE PATENTS granted by the

UNITED STATES, GREAT BRITAIN, FRANCE, BELGIUM, AUSTRIA and CANADA,

THE COMPANY IS NOW READY TO EXECUTE ORDERS.

The first Machine manufactured was put up soon after the United States patent was granted, in February 1880, in the Atlantic Mills, Brooklyn, and has been in almost constant practical use since, demonstrating beyond a question that it possesses the following advantages:

- It Purifies Middlings Absolutely Without Waste.
- It Purifies Middlings with Greatly Reduced Power.
- It Purifies Middlings with Greatly Reduced Space.
- It Purifies Middlings with Greatly Increased Rapidity.
- It Purifies Middlings from Spring and Winter Wheat Equally Well.
- It Purifies Middlings with the Best Results.
- It Dispenses with the Use of Air Blasts.
- It Dispenses with the Use of all Dust Houses.
- It Dispenses with the Use of all Dust Collectors.
- It Dispenses with the Use of all Sieve Brushes and Cleaners.
- It Dispenses with the Dangers of Explosion and Fire.
- IT PURIFIES DUST HOUSE MATERIAL OF ALL KINDS.
- IT PURIFIES THE FINEST MIDDINGS OF ALL KINDS.
- It is Remarkably Adapted to Custom Mills.
- It is Excellently Adapted to Manufacture Farina.

Where the Electric Purifiers May Be Seen in Operation.

We desire to state, July 29th, 1881, we have shipped our Electric Purifiers to the following parties, at central points, where they may be seen in regular use by millers desirous of investigating the Electric System:

Atlantic Mills, Brooklyn, N. Y.; Archibald Schirmeier & Smith, St. Paul, Minn.; F. L. Johnston & Co., St. Louis, Mo.; Washburn, Crosby & Co., Minneapolis, Minn.; Norton & Co., Chicago, Ill.; Sanderson & Co., Milwaukee, Wis.; M. C. Dow & Co., Cleveland, Ohio; James K. Hurin, Cincinnati, Ohio; Mosely & Motley, Rochester, N. Y.; Chas. Tiedmann, O'Fallon, Ill.; Lyman & Co., Norfolk, Va.; Texas Star Flour Mills, Galveston, Texas; Zenith Milling Co., Kansas City, Mo.; C. Hoffman & Son, Enterprise, Kansas; I. Durst & Son, Dayton, Ohio; Richter & Co., Williamstown, W. Va.; Kinney & Hobart, Barrton, Kansas; Parkville Milling Co., Parkville, Mo.; Norton & Co., Lockport, Ill.; Ballard, Isom & Co., Albany, Oregon; Niedhammer & Walton, Buena Vista, Ind.

SOMETHING NEW!

A Combination Electric Purifier—A Complete System of Three Purifiers in One.

To meet the frequently expressed wants for small and custom mills of 50 and 60 barrels capacity and under, we have just planned, put under construction and applied for a patent, a Combination Electric Purifier, by which Middlings can be completely finished on a single machine and by a single operation as thoroughly as by a system of three purifiers.

A full description of this new combination purifier with the prices of different sizes is inserted in a new issue of our descriptive circular, which will be sent out from the New York office on application. Samples of work will be sent upon application, by mail, and all inquiries answered from the New York office.

Parties contemplating building new mills, or reconstructing old ones, should see the superior working of the ELECTRIC SYSTEM, before making contracts for Purifiers elsewhere.

JOHN RICE,

New York, May 26th, 1881.

General Manager.

No. 17 Moore St., NEW YORK.

CUNN, CROSS & CO., Minneapolis, Minnesota,

Manufacturers and Agents for the Northwest.

EVERY MILLER IS INVITED

To write to some other miller using the Case Purifier. There is no doubt about its being

The Purifier of the Times.

It is about one half cheaper, capacity considered, than any Purifier in the market.

We would rather have it than two Purifiers of any other make. W. P. HAMBAUGH & CO., Clarksville, Tenn. We believe it to be the best machine on the market. BALDWIN & EULLER, Ottawa, Kansas. Can govern it to do anything we want. It could do no better. CAMAN & McFARLAN, Urbana, Ohio. For all particulars address

CASE MFG CO., Columbus, O.

[Please mention this paper when you write us.]

Millers, Attention!

You can successfully purify the chop from either Stone or Rolls with the

Wheat Meal Purifier.

Satisfaction Guaranteed or No Sale.

THIRTY DAYS' TRIAL.

Send for circular and full particulars to

Wheat Meal Purifier Co.,

Academy of Music, MINNEAPOLIS, MINN.

[Mention this paper when you write us.]

"THE GREAT ROCK ISLAND ROUTE"

Calls your attention to the following REASONS WHY, if about to make a Journey to the GREAT WEST, you should travel over it:

As nearly absolute safety as is possible to be attained. Pure connections in UNION DEPOSITS, at all important points. No change of cars between CHICAGO, KANSAS CITY, LEAVENWORTH, ATCHISON or COUNCIL BLUFFS. Quick journeys because carried on Fast Express Trains. Day cars that are not only artistically decorated, but furnished with seats that admit of ease and comfort. Sleeping cars that permit quiet rest in home-like beds. Dining cars that are used only for eating purposes, and in which the best of meals are served for the reasonable sum of seventy-five cents each. A journey that furnishes the finest views of the fertile farms and pretty cities of Illinois, Iowa and Missouri, and is afterwards remembered as one of the pleasant incidents of life. You arrive at destination rested, not weary; clean, not dirty; calm, not angry. In brief, you get the maximum of comfort at a minimum of cost.



That the unremitting care of the Chicago, Rock Island & Pacific Railway for the comfort of its patrons is appreciated, is attested by its constantly increasing business, and the fact that it is the favorite route with delegates and visitors to the great assemblies, political, religious, educational and benevolent, that assemble from time to time in the great cities of the United States, as well as tourists who seek the pleasant lines of travel while en route to behold the wonderful scenes of Colorado, the Yellowstone and Yosemite. To accommodate those who desire to visit Colorado for health, pleasure or business, in the most auspicious time of the year, the summer season and months of September and October, the Company every year puts on sale, May 1st, at all coupon ticket offices in the United States and Canada, round trip tickets to

DENVER, COLORADO SPRINGS and PUEBLO.

At reduced rates, good returning, until October 31st. Also to San Francisco, for parties of ten or more, good for ninety days, at great reduction from regular fares.

REMEMBER, this is the most direct route for all points WEST and SOUTHWEST. For further information, time-tables, maps or folders, call upon or address

R. R. CABLE,
Vice-President and Gen'l Man'gr, Chicago.

E. ST. JOHN,
Gen'l Ticket and Pass'r Agent, Chicago.

WE HAVE THE BEST GATE IN EXISTENCE, and by it the MOST DIRECT and EFFICIENT APPLICATION of the water to the wheel.

MEDAL & PREMIUM AWARDED TO
ALCOTT'S
Most Perfect Turbine in Use.



MANUFACTURERS OF
Circular Saw Mills, Shafting, Pulleys,
Hangers & General Mill Machinery.
Selling Particulars of Stream, &c.
Address: T. C. ALCOTT & SON,
Mount Holly, N. J.

[Mention this paper when you write us.]



Nickle FLOUR TESTERS mailed for 25c.

Mill Property For Sale.

A Mill in Sheboygan County, Wis., with a large custom trade, unlimited water power, and four run of stone. Will be sold on reasonable terms. Full information will be given at 106 West Water Street, Milwaukee, Wis.

JOHN C. HIGGINS,
Manufacturer and Dresser of

Mill Picks,

No. 169 W. Kinzie Street,
CHICAGO, ILLINOIS.



Picks will be sent on 30 or 60 days' trial to any responsible miller in the United States or Canada, and if not superior in every respect to any other pick made in this or any other country, there will be no charge, and I will pay all express charges to and from Chicago. All my picks are made of a special steel, which is manufactured expressly for me at Sheffield, England. My customers can thus be assured of a good article, and share with me the profits of direct importation. References furnished from every State and Territory in the United States and Canada. Send for Circular and Price List. Jan

[Mention this paper when you write us.]

Northwestern Mill Bucket Manufactory

310, 312, 314 FLORIDA STREET.



Is furnishing Mills and Elevators in all portions of the country with their superior BUCKETS. They are UNEQUALLED for their SHAPE, STRENGTH and CHEAPNESS.

Leather, Rubber, Canvas Belting and Bolts at lowest market rates. We have no traveling agents. Sample buckets sent on application. Large orders will receive liberal discounts. Send for sample order. Address all inquiries and orders to

L. J. MUELLER, 197 Read St., Milwaukee.

[Mention this paper when you write us.]